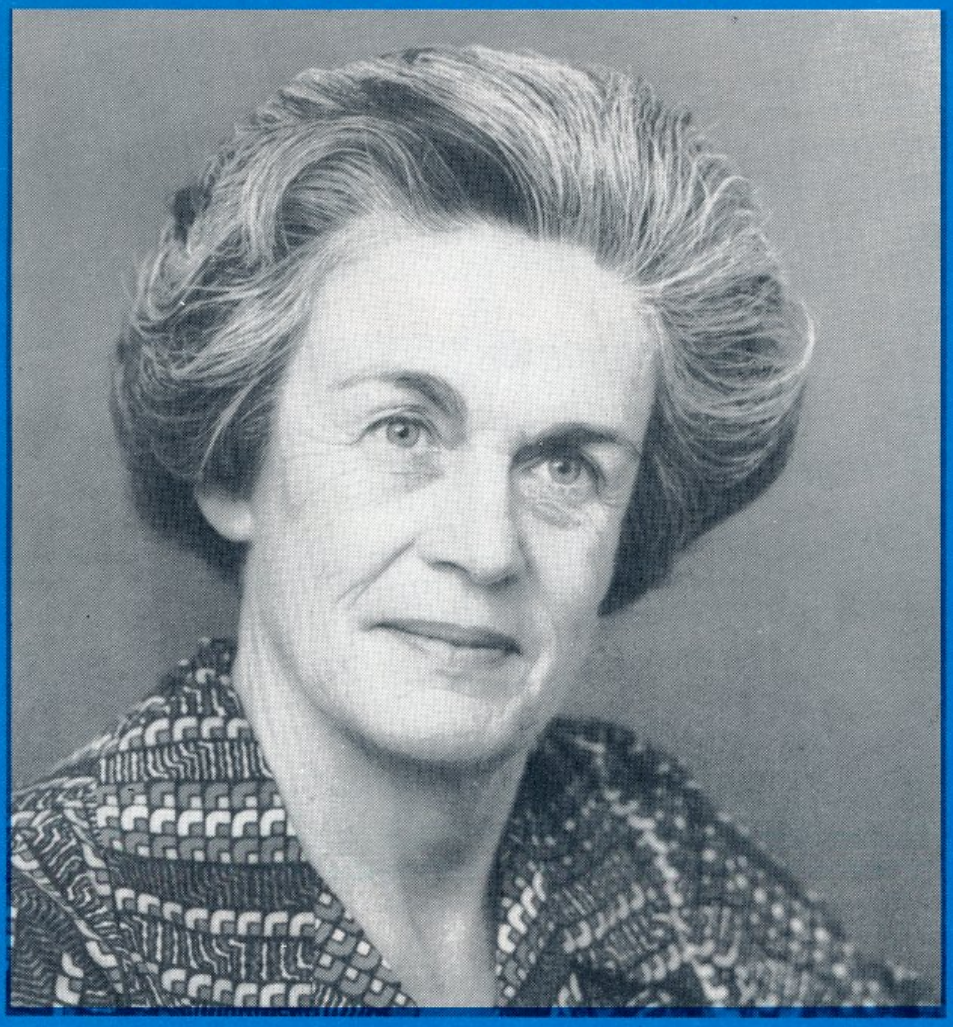
Amateur Radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA
VOL 55, No 9, SEPTEMBER 1987



SAFETY AROUND THE SHACK
SPECTRUM ANALYSER WAVEFORMS
1987 RD OPENING ADDRESS
AIRCRAFT RESTORATION

KENWOOD

FOR PEOPLE ON THE GO — TWO SUPER-COMPACT MOBILES

TM-221A 2 METERS
TM-421A 70 cm

TR-751A 2 METERS
TR-851A 70 cm

The TR-751A all-mode, 2-m transceiver delivers superior performance and "All Mode Mobility". Packed with all of the most often needed features including auto-mode selection, dual digital VFOs, 10 memories plus "COM" channel, programmable CTCSS tone, various scan functions, all-mode squelch, noise blanker, RIT, DCL (Digital Channel Link) and easy-to-operate front panel layout. And, designed with the latest state-of-the-art technology, this compact rig is the one to choose for VHF stations on-the-go.

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.

4E WOODCOCK PLACE, LANE COVE, SYDNEY, N.S.W. 2066. Ph. (02) 428 1455.

YOUR DEALER BELOW WILL GUARANTEE SATISFACTION

Further, beware of dealers not listed in this advertisement who are selling Kenwood communications equipment. All Kenwood products offered by them are not supplied by Kenwood Electronics Australia Pty. Ltd. and have no guarantee applicable.

N.S.W.:

EMTRONICS — 94 WENTWORTH AVENUE, SYDNEY (02) 211 0988
REG STOCKMAN COMMUNICATIONS — CNR BANOCKBURN ROAD & SHIRLEY STREET, INVERELL (067) 22 1303
WORMALD COMMUNICATIONS — 51 DENNISON STREET, HAMILTON, NEWCASTLE (049) 69 1999
MACELEC PTY. LTD. — 99 KENNY STREET, WOLLONGONG (042) 29 1455
ALEX JOHNSON — 19 BANKSIA STREET, O'CONNOR, A.C.T. (062) 47 9125
DX ENGINEERING — 158 GRANITE STREET, PORT MACQUARIE (065) 84 9922
FRANK BOUNDY — LISMORE (066) 86 2145

INTERSTATE

VIC.:
PARAMETERS PTY. LTD. — 1064 CENTRE ROAD, SOUTH OAKLEIGH (03) 575 0222
EMTRONICS — SHOP 5 TO 7, 288-294 QUEEN STREET, MELBOURNE (03) 670 0330
BRIAN STARES — 11 MALMSBURY STREET, BALLARAT (053) 39 2808
SUMNER ELECTRONICS — 78 KING STREET, BENDIGO (054) 43 1977

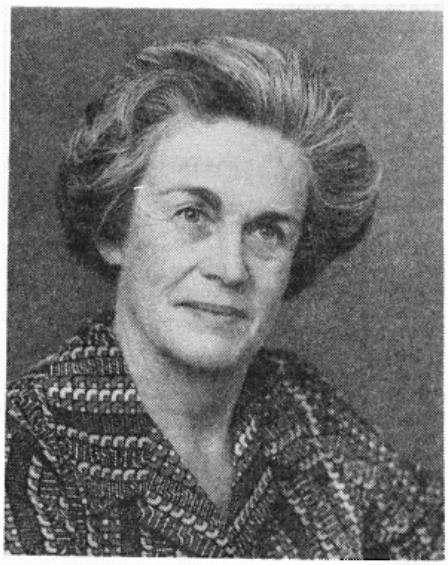
TAS.:
HOBBY ELECTRONICS — 477 NELSON ROAD, MT. NELSON (002) 23 6751
WATSONS WIRELESS — 72 BRISBANE STREET, HOBART (002) 34 4303
MARINE & COMMUNICATION — 19 CHARLES STREET, LAUNCESTON (003) 31 2711
V.K. ELECTRONICS — 214 MOUNT STREET, BURNIE (004) 31 7733

QLD.:
MITCHELL RADIO CO. — 59 ALBION ROAD, ALBION (07) 357 6830
EMTRONICS — 416 LOGAN ROAD, STONES CORNER, BRISBANE (07) 394 2555

S.A. & N.T.:
INTERNATIONAL COMMUNICATIONS SYSTEMS PTY. LTD. — 8 NILE STREET, PORT ADELAIDE (08) 47 3688

W.A.:
WILLIS ELECTRONICS — 165 ALBANY HIGHWAY, VICTORIA PARK (09) 470 1118
BAY RADIO — 22 GRACE STREET, FERNDALE (09) 451 3561
FORD ELECTRONICS — UNIT 19, 70 ROBERTS STREET, OSBORNE PARK (09) 242 1766

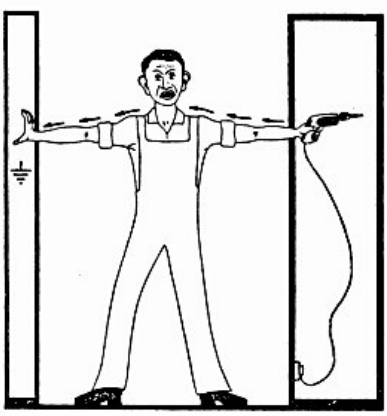
Amateur Radio

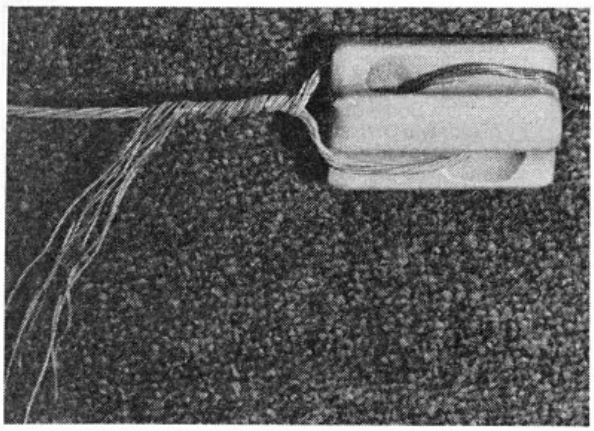


FRONT COVER: Dame Beryl Beaurepaire, DBE, Chairman of the Australian War Memorial, delivered the Opening Address for the 1987 WIA Remembrance Day Contest.

Special Features

Technical Features





Regular Features

DEADLINE

All copy for inclusion in the November 1987 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9 am, September 21, 1987.

Amateur Radio

Published monthly as the Official Journal by the Wireless Institute of Australia, founded 1910. ISSN 0002 — 6859. Registered Office: 3/105 Hawthorn Road, Caulfield North, Vic. 3161. Telephone: (03) 528 5962.

EDITOR

BILL RICE* VK3ABP

TECHNICAL EDITORS

PETER GAMBLE* VK3YRP
PETER GIBSON* VK3AZL
EVAN JARMAN* VK3ANI
DOUG MCARTHUR* VK3UM
GIL SONES* VK3AUI

CONTRIBUTING EDITORS

Frank Beech VK7BC
Brenda Edmonds VK3KT
Ron Fisher* VK3OM
Gilbert Griffith VK3CQ
Ken Hall VK5AKH
Roy Hartkopf VK3AOH
Robin Harwood VK7RH
Ron Henderson VK1RH
Colin Hurst VK5HI
Eric Jamieson VK5LP
Bill Martin VK2COP
Len Poynter* VK3BYE
Hans Ruckert VK2AOU

DRAFTING

George Brooks
Liz Kline

FEDERAL OFFICE MANAGER

(Mrs) Ann McCurdy

***Members of Publications Committee**

Inquiries and material to:
The Editor,
PO Box 300,
Caulfield South, Vic. 3162.

Material should be sent direct to **PO Box 300, Caulfield South, Vic. 3162,** by the 20th day of the second month preceding publication. **Note:** Some months are a few days earlier due to the way the days fall. Check page 1 for deadline dates. **Phone: (03) 528 5962.**

HAMADS should be sent direct to the same address, by the same date.

Acknowledgment may not be made unless specifically requested. All important items should be sent by Certified Mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying a reason.

TRADE PRACTICES ACT

It is impossible for us to ensure the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that, the provisions of the Act are complied with **strictly.**

VICTORIAN CONSUMER AFFAIRS ACT

All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

Production: BETKEN PRODUCTIONS
5 Masefield Avenue, Mooroolbark, Vic. 3138.
FAX:(03) 726 7059

Laser Scanned Colour Separations by: QUADRICOLOR INTERNATIONAL (AUSTRALIA) PTY LTD
3 Lake Drive, Dingley, Vic. 3172.
Tel:(03) 551 3333

Typesetting by: BETKEN PRODUCTIONS
5 Masefield Avenue, Mooroolbark, Vic. 3138.

Make up and Photo Reproduction by: EASTERN ADVERTISING PTY LTD
PO Box 558, Lilydale, Vic. 3140
Tel:(03) 735 5410

Photographic Film and Processing Material courtesy: AGFA-GEVAERT LTD AUSTRALIA

Printed by: LEADER WESTERNPORT PRINTING PTY LTD
1 University Place, Clayton North, Vic. 3168.

Tel:(03) 560 5111.

Mail Processing by: AUTOMAIL PTY LTD
14 Stamford Road, Oakleigh East, Vic. 3166.
Tel:(03) 568 6677

Editor's Comment

"ALL I GET IS THE MAGAZINE!"

We have all heard this complaint many times, often from those who ought to know better;

"All I get for my WIA subscription is the magazine!"

Particularly from country members, whose variation is;

"It's OK for you city blokes who can go to meetings (etc, etc), but all we get in the country for our sub is the magazine!"

At the last Federal Convention a list of WIA services was exhibited. Largely, it was put together by one member of Executive (Ron Henderson VK1RH). How many different items do you think it shows? Three? Five? Ten? Would you believe, THIRTY FIVE? Actually the original list showed 33. Without having to think too hard, I've added two more!

I mentioned this list at the last Publications meeting. I was the only one present who had been at the Federal Convention. Even the Committee, keen and hard-working members as they are, could not imagine that many services! Obviously we are hiding our light under the proverbial bushel. This list needs to be impressed on every member, and even more on every non- member.

Actually, many of these services, unlikely to exist without the Institute, are to the benefit of all amateurs, members or not, city or country. Some of them are only provided by one or two Divisions. Some are free in some States but cost extra in others. Three are still being planned, either to provide a new type of service, renew an old one, or because the system is being changed. Most of the benefits are free in all States.

"Come on", you say, "What are these services? Don't keep us in suspense!" So here is the list, in alphabetical sequence. An asterisk (*) means it costs you something, membership subscription at least, maybe extra.

Advisory Committees DOC/WIA (possibility)
AMATEUR RADIO (The magazine!) *
Beacons
Book Sales *
Component Sales * (some Divisions)
Contests
Conventions
Disposals Sales * (some Divisions)
EMC Advice
Equipment Insurance * (some Divisions)
Examinations * (probability)
Exam Classes *
Exhibits/rallies/meetings
Government Liaison
Headline news phone bulletin boards (some)
IARU Liaison
Intruder Watch
Licensing, technical advice *
Members' Advertisements *
Morse Tests
News Broadcasts
Observer Service (some Divisions)
Operating Awards (* sometimes)
Planning Permit Advice (* some)
Propagation Predictions
QSL Bureau *
Reciprocal Licence information *
Repeaters
Slow Morse
Special Event Call Signs
Specialist information newsheets *
Special news bulletin boards (planning)
Standards Participation (Executive/SAA)
Videotape Library *
WICEN

May I leave you with one last comment. Our President (VK3ADW) and Executive Vice President (VK3YRP) were the guests of NZART at its recent annual management conference. They thoroughly enjoyed the proceedings, learnt much from the ZLs, and were able to help with advice from VK now and then. But they were staggered to find (even in Kiwi dollars, which don't buy quite as much as ours!) that a licence over there costs $60, and membership of the NZART is $55 (including 10 percent general services tax). What are some VKs complaining about?

Bill Rice VK3ABP
Editor

SILENT KEY

It is with the greatest regret that we announce the death, on July 28, of Max Hull VK3ZS.

Max, an Honorary Life Member of the Institute, had been Federal Historian for many years up to the time of his death, and was Federal President from 1958-1961 and again from 1965-1967.

THE FUTURE OF AMATEUR RADIO

Ron Henderson VK1RH
and
Steve Phillips VK3JY

A Paper by the "Future Amateur Radio Working Party" Established under the authority of the Federal Council of the Wireless Institute of Australia

It is trite to observe that "change for changes sake" is often mistaken for progress.

The 1986 Federal Convention set up "The Future of Amateur Radio Working Party" to report on stated terms of reference to the 1987 Federal Convention.

The Working Party was unable to meet that time scale and it is timely that members of the Institute be given an opportunity to review some of the important aspects considered by the Working Party to date.

The purpose of this paper is to establish given data known to the Working Party, together with a review of the immutable limitations and constraints surrounding amateur radio at present and the future.

It is trite to observe that "change for changes sake" is often mistaken for progress. However, it is realistic to acknowledge that changes in technology and modes of communication over recent years will inevitably have significant impact on our world of amateur radio.

In making changes, we must ensure that movement toward such change is co- ordinated, as piecemeal changes are never satisfying.

Recent discussions surrounding proposals to broaden privileges for novice operators demonstrate that there is a need for a comprehensive review of licence levels, amateur qualifications and their associated operating privileges. Any review undertaken must be logical with recommendations which are simple, easy to understand, administer and regulate.

The Future of Amateur Radio Working Party sees its role to examine all feasible options, but to limit the final selection of recommendations to a robust complimentary set acceptable to the majority of members of the Institute. It is obvious that not all recommendations are going to meet with total agreement amongst all Institute members and amateur operators in Australia.

The Institute must also take into account the policies and attitudes of our licensing authority, the Department of Communications, which has the responsibility of ensuring the administration of the Amateur Radio Service within Australia operates within international agreements. Further, DOC constraints relating to pressing demands for spectrum space, examination and licensing costs, and limited resources to devote to what is fundamentally a "hobby service," dictates a departmental management approach based on simplicity and ease of administration.

MEMBERSHIP AND BAND USAGE

Some of the comparatively few letters on the future of amateur radio received by the Institute have expressed concern at the falling off of new entrants to the Amateur Radio Service following the burst of the CB "bubble." These comments are reflected at times in contacts heard over the air.

The implication immediately drawn is that such a reduction in the number of amateur operators will mean a consequent reduction in membership of the Wireless Institute of Australia.

The increases in numbers of amateur licences since 1976 issued by DOC can be seen in Graph 1.

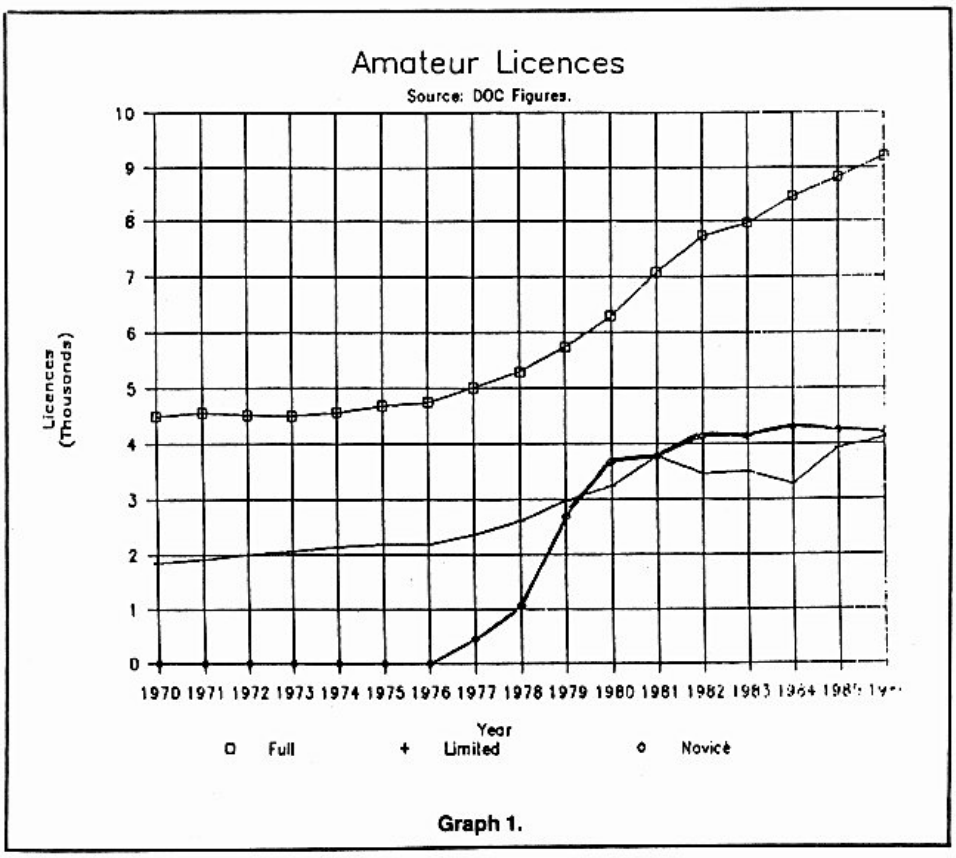
Interest in the Amateur Radio Service obviously continues at a relatively high level; perhaps what is more an issue is the pressure due to spectrum demands by other users than the Amateur Radio Service and the unknown factor as to what percentage of licenced amateur radio operators regularly use their licence in some, most, or all allocated bands.

EXAMINATION LEVELS AND ENTRY POINTS TO THE HOBBY

It is a simple fact which must be faced that devolution of amateur examinations will happen in the near future and all new examining bodies (with DOC involvement or not) will demand full cost recovery in some shape or form. It is reasonable to assume that the cost of conducting examinations will remain relatively costly, and it is in the interests of the Amateur radio Service that entry points to the Amateur Service be kept small in an effect to keep costs down.

On the other hand, increased operating modes and licence privileges can be logically associated with increased technical knowledge. In accepting this, it must not be forgotten that all modes in the Amateur Radio Service have a common basic theoretical background at a hobby skill level rather than a professional communications skill level. Many comments are heard on the lack of practical operating experiences for new licensees. The Institute must address itself to this problem by examination of methods of introducing practical experience in training courses, the use of club and other stations, and perhaps the adoption of the "Elmer" approach from North America.

Concern has been expressed about entry points to the hobby. There appears to be some evidence that Novice examination levels have risen since



Graph 1.

the introduction of this licence in 1976. The world and circumstances have changed since then, and there has been a distinct change in emphasis from "how and why" with some home construction being to the fore to the current operation and use of "black boxes" capable of a wide range of transmission modes of data.

There is often confusion between realising that utilisation of amateur bands is simply a reflection of occupied bandwidth, however the skill level in any graded system of licensing assumes varying levels of technical ability in translating intelligence to a modulating signal being sent over the air.

An ideal solution in an ideal world seem to support multiple entry points to the hobby with a few examination subjects, together with motivations and desire from those once licenced to use their full operating privileges at whatever licence level on a regular basis.

It is claimed that Novice theory examination levels have risen beyond the basic theoretical background originally envisaged, and the Novice examination may have changed from a relatively simple entrance test to a quota pass test to regulate numbers entering the Amateur Radio Service. There is a strong sentiment of support for the concept of restoring the original novice examination level of difficulty rather than as a quota mechanism.

The current Wireless Institute of Australia policy is to support a licence grade no lower than novice with that level of entry establishing (in the theory examination), a basic technical hobby understanding of communications. In contrast to this, there has been a need expressed for a "student permit" for supervised novice-like operations by radio class students in club and Institute courses. Is this necessary, given the relatively broad "second operator" provisions currently in vogue?

It would seem that our efforts would be better oriented towards re- establishing a basic novice theory level of examination rather than focusing on a sub-novice level which is implied by "student permits."

RETENTION OF THE MORSE CODE REQUIREMENT FOR FULL NOVICE LICENSES

Long, animated and sometimes heated debate continues on the need for retention of Morse by amateur operators.

The present facts are that the International Telecommunication Union (ITU) Radio Regulations, require the Amateur Radio Service to hold a simple skill level in the use of Morse for licensees below 30 MHz. This has to be acknowledged at least for the issuing of reciprocal licenses. Whether this state of affairs will continue in the future is beyond the competence and control of the WIA as it is a DOC and government matter, however it is acknowledged that each and every amateur operator will form his own opinion on this matter.

The Australian Government subscribes to the International Telecommunication Union Radio Regulations and international agreements, particularly those relating to reciprocal licensing, are extremely difficult to alter and any desire to change this aspect of the Amateur Radio Service must be seen from an international viewpoint rather than our own backyard.

RECIPROCAL LICENSES AND THE SURPRISING PRESSURES THEY BRING

The recently negotiated reciprocal agreement with Japan is, at least in the short term, irreversible with VK novices currently being disadvantaged — this is a simple fact which we must, for the present, accept for better or worse.

Whist some may argue otherwise, there has developed support in recent years for a common band for all amateur grades of licence. The single most logical argument for such an approach is the element of unification of amateur operators which would develop if such a plan was adopted.

What cannot be agreed on as yet, is which band is the appropriate one for such activity — suggestions have included six-metres, two-metres or 70 centimetres and one proponent has even suggested UHF CB!

In another vein, there is a case to seek to have our full licence equated with similar overseas licenses with slightly differing Morse speed requirements.

CONCLUSION

Over the next few months, the Future of Amateur Radio Working Party will examine various factors including frequency bands and emissions, together with licence restructuring.

The Working Party would be pleased to receive input from members of the Institute through their Federal Councillors in regard to the factors detailed in this paper together with any comments on other matters they consider of importance.

Members are reminded that the WIA is managed by the Federal Council and the Future of Amateur Radio Working Party is established under the authority of that Council. It is, therefore, appropriate that comments be passed through each Federal Councillor rather than directing your remarks straight to the Federal Executive.

To assist you in communicating with your Federal Councillor, their names and addresses are reproduced below:

VK1 — George Brzostowski VK1GB
PO Box 600, GPO, Canberra, ACT. 2601

VK2 — Jeff Pages VK2BYY
C/- PO Box 1066, Parramatta, NSW. 2150

VK3 — Danny Vits VK3XDV
PO Box 336, Kyneton, Vic. 3444

VK4 — John Aarsse VK4QA
PO Box 211, Nambour, Qld. 4560.

VK5 — Rowland Bruce VK5OU
33 Sunhaven Road, Redwood Park, SA. 5097

VK6 — Neil Penfold VK6NE
2 Moss Court, Kingsley, WA. 6026

VK7 — Joe Gelston VK7JG
PO Box 1311, Launceston, Tas. 7250

ar

FUTURE OF AMATEUR RADIO

Ron Henderson VK1RH
and
Steve Phillips VK3JY

Is amateur radio really at the crossroads?

It has been suggested that our hobby is far less exciting today to the general public than it was 30 years ago. Today, via ISD, anyone can communicate almost anywhere in the world with the greatest of ease and at reasonable cost. An overseas telephone call was difficult, noisy and expensive 30 years ago. Is it reasonable to argue that the DX magic of amateur radio is today not as exciting and mysterious as it was 30 years ago?

There have been many discussions on these and related matters amongst amateurs in recent years, together with valuable contributions in discussion papers "Amateur Radio — Future Direction" by Jim Linton VK3PC and Roger Harrison VK2ZTB, and "Novice Licensing into the 21st Century" by Gordon Bracewell VK3XX, printed in February and August 1986 editions respectively of this magazine. In April 1987, Ron Henderson VK1RH, published a Federal Convention Agenda item on the issue of the Future of Amateur Radio.

These discussions have set the scene for the Federal Council of the WIA to encourage the future of Amateur Radio Working Party to promote discussion in this area.

In preparation for the 1987 Federal Convention, VK1 Division aired the topic at a Divisional meeting to determine members views, VK2 Division held a forum with sadly less than 10 members in attendance, VK4 Division circulated their clubs and presented a well considered paper at the Federal Convention which was included in the Convention Minutes. VK5 Division discussed the topic at a Conference of Clubs and the VK6 Division's presentation to the Federal Convention was based upon a report to their Council. In summary, all Divisions considered and spoke in depth on the matter at the Convention.

The "Future of Amateur Radio" was an important Federal Convention discussion and action item and the key points raised with supporting arguments became the Guidelines to the Executive with the future of amateur radio and were adopted unanimously by Federal Council. These Guidelines were published in last month's magazine, page 39, and you are invited to comment on them through your Division's Federal Councillor, whose names appear below. All correspondence should be directed via your Divisional Office.

VK1 — George Brzostowski VK1GB

VK2 — Jeff Pages VK2BYY

VK3 — Danny Vits VK3XDV

VK4 — John Aarse VK4QA

VK5 — Rowland Bruce VK5OU

VK6 — Neil Penfold VK6NE

VK7 —Joe Gelston VK7JG

ar

TEGA ELECTRONICS PTY LTD

SPECIALISTS IN RADIO FREQUENCY EQUIPMENT

Catering for
AMATEUR, COMMERCIAL, GOVERNMENT

Call in at:
75 Grand Boulevard, Montmorency, Vic. 3094

or phone
(03) 431 1153
Gary VK3ZHP

AERIALS: SOME PRACTICAL CONSIDERATIONS — III

ATTACHING THE AERIAL SYSTEM

Ted Roberts VK4QI
38 Bernard Street, Rockhampton North, QLD. 4701

QUITE OBVIOUSLY THE aerial must be insulated and a number of insulators have been used through the years. The most popular type has always been the "egg" insulator and there must still be quite a few of these old-fashioned porcelain receiving eggs available.

They are not the ideal type to use for a transmitting aerial however, unless they are used in a string of three or more. There were larger types of egg insulators made for transmitting use, but even these types are advisedly used in pairs. (If you doubt this check the SWR of an aerial at its resonant frequency with one insulator at each end and then again after a second insulator has been added at each end). It pays to remember that the end of an aerial or ends of a dipole are at a very high impedance and the dielectric losses can be quite high from the ends of the aerial. Quite large egg insulators are used in the power transmission industry but these are impracticable because of their weight.

These egg insulators are used in the compression mode and the aerial will not fall down if they are broken. Another type of transmitting insulator which operated under tension was the rod or tension type. Again, commonly made of porcelain, they would let the aerial down if they became broken, but they had the advantage of being fairly long. Consequently, dielectric losses were much lower. A large number of these were made from glass with eyes moulded at each end and a series of corrugated ridges moulded throughout the length of the insulator to increase the surface path, and so the insulation resistance. The average WWII or marine version of these are sometimes still available but they are fairly heavy.

When an aerial is pulled tight between two masts any excess weight contributes largely to the sag in the aerial. It is theoretically impossible to strain an aerial so tight that there is no sag at all between the ends of the aerial. This sag is known as the "catenary" sag of the aerial and it will be found that the tension on the halyards increases greatly as you attempt to raise the centre of the aerial another 30 centimetres or so. This bending moment, or load, is transferred to the guy wires or to the mast structure and can be very high if used to the extreme. The stiffer the structure the less the catenary sag but the costs of the stiffer structure rise almost as fast as the extra tension desired. It is something like trying to catch up with galloping inflation! For this reason, it is desirable to keep the weight in the centre of the aerial as low as possible as this increases the amount of sag, more so than the weight at the ends of the aerial.

Since WWII, the miracle of plastics has entered our lives and we can use plenty of alternatives to porcelain for insulators. One of the most common alternative insulators is the well-known PVC electrical conduit or plumber's pipe. This makes a very satisfactory substitute and the length can be made reasonably ling to increase the insulation resistance. Be sure to drill the holes for the wire at least half an inch from the ends for sufficient strength when it is hauled up on the halyard. Another type of plastic insulator (used personally) is three or four links of heavy plastic chain. This is very effective but suffers from two drawbacks. If a large strain is placed on the chain one of the links breaks after a short time. The same thing happens when very cold nights cause the aerial to shrink and the stress resistance of the plastic is reduced in low temperatures also.

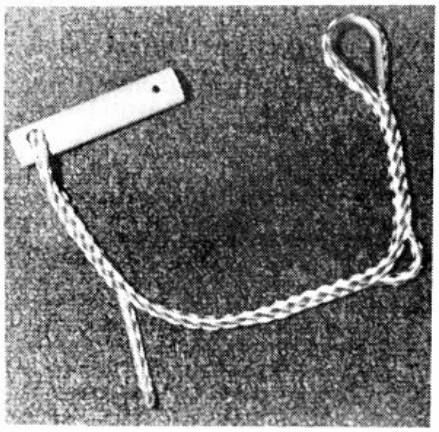
However, these plastic links make good light insulators for that standby HF dipole carried in the boot of the car for portable use. Centre insulators for dipoles can be made from PVC sheet with holes drilled for aerial wires and feeders, or to support a ferrite balun and coaxial feeder.

Another good substitute is a block cut from the family nylon cutting board. (For your own peace of mind, and health, do not let your wife catch you! You could always blame it on rats or white ants, hopefully).

Because the previously mentioned, high impedance exists at the ends of the aerial, it makes good sense to use rope to secure the insulators to the halyard. The plaited hollow type of polypropylene rope is recommended for this purpose.

Begin by tying a clove hitch through the egg insulator or a clove hitch around the rope after threading it through a tension or conduit type of insulator. With the conduit, make sure you have countersunk and removed all burrs from the holes drilled through the conduit. You may prefer to feed the end of the rope back inside itself as previously described and feed the end out of the main length of the rope and then back inside again a little further along the rope. This will ensure it does not pull out with annoying results.

Galvanised or copper wire can be used instead of rope and, if so, it is a good idea to use two insulators in series if egg insulators are used. Another type of material to connect the insulator to the halyard is a fairly heavy piece of nylon fishing line. If you are not a fishing enthusiast ask a fisher-friend to explain the secret of tying the ends of nylon as it does not conform to the normal type of knot tying due to the lack of friction in the material. It is an excellent material to use on portable aerials as the material itself can be used as the end insulator for the aerial. To connect the end rope or wire to the halyard tie a galvanised rope thimble to the halyard end of the rope. If this is fitted inside the same fitting tied on a short loop in the halyard the mechanics of the system are up to specifications. To do this, hold each leg of the thimble in a shifting spanner and pull each leg apart. Fit one thimble inside the other and close the thimble up again.

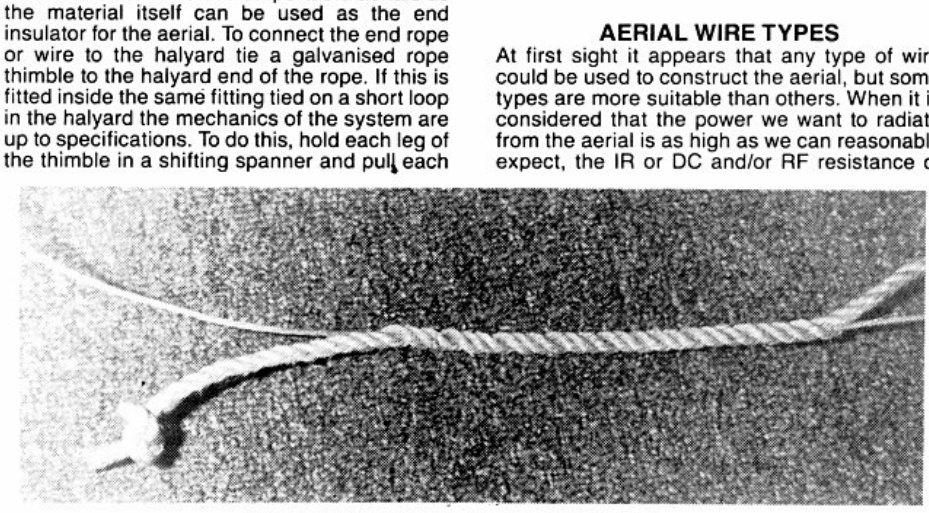


Left: Conduit Insulator Termination to Woven Polypropylene Insulator. Right: Galvanised Thimble to Woven Rope. Rope re- entry into Rope shown open for Demonstration.

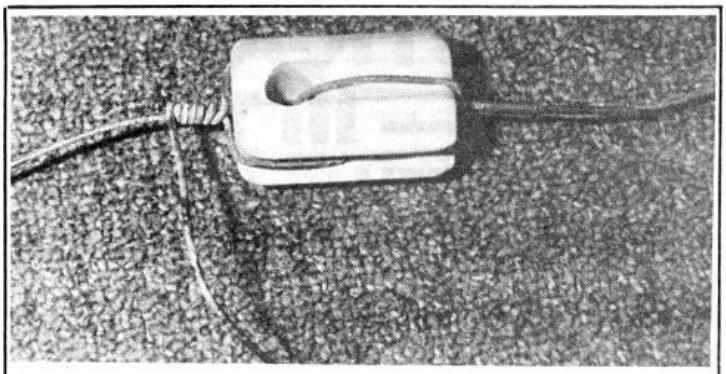
A need sometimes exists to pull an aerial or strain wire up to a tower, building, etc, and secure the end while the wire is still under tension. A very old idea called a "snotter" is ideal for this purpose. Tie a common finger knot in the end of a piece of hauling rope. The lay of the rope is opened up and threaded around the wire for some 15 or 20 turns. The harder the hauling rope is pulled the tighter it will grip the wire and the rope can be tied-off until the end of the wire is terminated and the rope may then be untied and unwrapped from the wire.

AERIAL WIRE TYPES

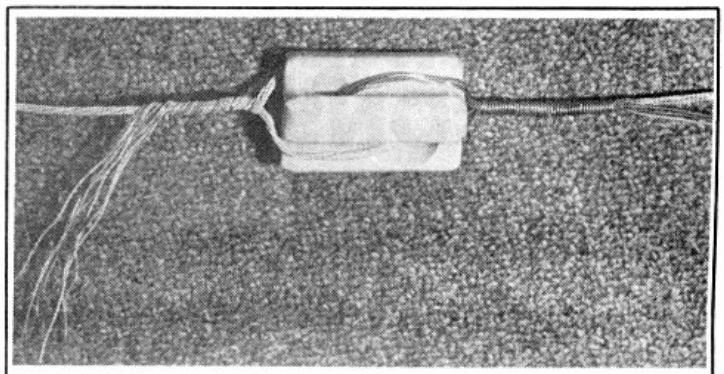
At first sight it appears that any type of wire could be used to construct the aerial, but some types are more suitable than others. When it is considered that the power we want to radiate from the aerial is as high as we can reasonably expect, the IR or DC and/or RF resistance of



"Snotter" for Hauling Aerial or Aerial Tail.



Left: Single Strand Aerial to Tail. Right: Single Strand Aerial Tail with Swaged Copper Tube Termination.



Left: Wrapped Joint. Right: British PO Joint.

the aerial wire should be kept as low as is reasonably possible. This resistance is effectively in series with the useful radiation resistance of the aerial and so dissipates a proportion of the power from our "U-Beaut" transceiver. Considerable money has been spent on this device and it is rated to deliver X watts to the aerial, there is not much point in willfully throwing some of this expensive RF energy away in an aerial with high resistance elements. It is not suggested that the aerial be constructed from heavy copper busbar, but, at the same time, do not build it out of bell wire. It will work but the losses are quite pronounced.

Most authorities suggest from No 8 to No 14 hard-drawn copper wire as the material to use for wire aerials. The reason for hard-drawn copper wire is to limit any tendency for the wire to stretch under strain. It may be heresy, but I suggest that green plastic covered earth wire, such as the old fashioned 7/029 or 7/036 wire, makes a very satisfactory material for the average amateur. I would hesitate to use it on a very long span aerial such as a rhombic of 10 wavelengths per leg at 7 MHz, but for general use, I have found it satisfactory for a halfwave on 3.5 MHz. When using modern types of earth wire I would suggest checking that the number of strands do not exceed seven.

Instead of copper it is possible to use aluminium wire and there are many things in favour of this choice. It is lighter than copper and the DC resistance is only a few percent higher, so efficiency is comparable. You cannot solder aluminium if required, but the purists say you can't solder hard drawn copper either, the reason being that the solder area becomes brittle and may break. (I never solder copper wire where it is under tension, but make it off at a centre insulator and then solder a short tail of the wire where it is no longer under tension). With aluminium it becomes necessary to join by clamping or by twisting the two ends, then clamping. For this purpose, brass electrical service clamps or cable clamps are excellent but do not forget to apply Aluminox® or similar to the joint prior to clamping, particularly if dissimilar metals are being joined. It is advisable to carry a couple of cable clamps in the boot of the car in case a portable aerial coaxial feeder breaks away from the aerial whilst operating portable. (Soldering irons are not often available when camping in the bush.)

One of the peculiarities of RF current is the so-called "skin-effect" where the current tends to flow at the periphery of the conductor and virtually no current flows in the centre of the conductor. There is an apparent contradiction to this phenomenon when a conductor made of a large number of very fine wires is used. Under these circumstances, the RF resistance to current flow increases dramatically and again it is seen the hard-won power is dissipated in a high RF resistance in series with the radiation resistance of the aerial. It is for this reason I suggest that earth wire or stranded wire be limited to seven strands. Incidentally, covered copper wire or house-wiring cables are soft-drawn! They are much easier to handle and have the same tendency to kink during handling as hard- drawn cable. If they are plastic covered, the kink-tendency is improved considerably.

The situation can be improved by unrolling the wire, or by taking five or six turns off the roll from one hand and then reverse the roll in your hand and feed the same number of turns from the other hand. By feeding the wire alternatively the natural curl in the wire cancels out. If any kinking is noticed while constructing or erecting the aerial, drop everything and remove the kink immediately. Do this by hand if possible and smooth out all signs of the kink. Kinks will weaken the wire, especially hard-drawn wire, and will almost certainly fracture sooner or later.

As mentioned previously, the weight of the aerial increases the tendency for the aerial to sag. For this reason it is rarely necessary to use wire heavier than 7/029 or No 12 SWG (or their equivalents) for average amateur use.

TERMINATING WIRES ON INSULATORS

There are many ways of terminating aerial and feeder cables to the various types of insulators available.

Terminating to an old egg insulator is probably the most common case we will find. First, we consider the cable or wire being used. If it is a single strand it is fed through one eye of the insulator and bent "Z" fashion so the main length of wire takes off from the insulator at the centre of the insulator body. The free end of wire is then bent around the end of the insulator and wound carefully, and neatly, around the main wire for some eight or 10 turns. If this wire is needed to connect to a balun or feeder system, it can be left temporarily as is after wrapping to act as a tail for later connection.

If it is no longer required at the end of the aerial it may be cut off and the end pulled round neatly with pliers. In all length measurements of the wire, do not forget to measure from the loop end of the wire, **not** the place where the wire is twisted around itself.

Another method is to slip one or two short lengths of small, slightly flattened copper tube over the main wire. Bend as before and slip free end of the wire back through the tube and swage the joint by flattening the tube in a vice. Tap the tube with a blunt coal chisel between the two wires and parallel with them to tighten the swaged joint. *Do you wear a belt and/or belt and braces together?* This same theory comes into practice here whether you use two pieces of tube or just one.

If stranded wire is being used, the procedure is different although there is no valid reason why the method described above cannot be used. The usual method is the "British Post Office" or "Britannia" joint or variations of this joint.

Basically, proceed as before and thread the cable through the insulator and bend as before. Now, unravel one strand of the free end of cable after cutting the free end to be one foot or so in length. Wrap the single strand around both pieces of cable together as though winding a coil for some eight turns. Cut off the single strand and complete neatly with pliers. Next, unravel a second strand and coil as before for the same number of turns and finish as before. Repeat this process until all strands on the free end of the cable have been finished off neatly. If the end is needed to connect to feeders, etc. This method will not work so leave several feet on the free end and wind it around the main cable and leave the end free until used. Alternatively, the free end may be untwisted for several inches where it comes out of the insulator body and these strands neatly wrapped around the main cable like a ribbon. The end may be left until required, and, as it was not untwisted it will still be neat.

If it is necessary to terminate the tail from a feeder or similar to the egg insulator it may be brought through the same hole in the insulator and laid into the joint so that you are binding three wires together instead of two. This joint may be soldered to ensure high resistance does not develop in the joint.

If terminating a tension type or conduit type insulator, the wire is just fed through the hole or eye and wrapped around the main length of wire for a number of turns. This is quite strong and will last as long as you are likely to need the aerial. Tails can be finished off as for the egg insulator. If space is required between the aerial wires with egg insulators, two eggs can be wired in series and the spacing made to match the feeder spacing.

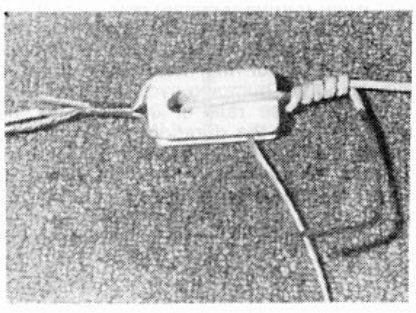
FEEDING THE AERIAL

Having now constructed the aerial to the selected design, it is now time to connect it to that piece of wizardry in the shack. There are two basic types of feeder systems to use — the balanced and unbalanced type of feeders. The balanced type is usually a two wire system (sometimes more). Neither wire is connected directly to ground and ideally each leg is balanced to ground. This can be upset if one leg passes close to an earthed metal pole or similar and the other leg is further away. Therefore, the ideal is to have both legs as symmetrical to ground as possible. Balanced feeders can be obtained in shielded cable form, but these are rather rare so they will not be discussed here.

The impedance of balanced lines is determined by the spacing and diameter of the wires used to construct the line, as mentioned in the text books. From application of this formula it can be seen that it is very difficult to construct a line having an impedance much below 150 ohms. As these lines are balanced there is no need to use a balun to feed the aerial and the impedance can be designed to comfortably match the aerial feed point. The line can be constructed ladder-style using plastic conduit spacers wired to the line conductors. If more spacers are deemed necessary when it is erected, the same length spacers can be drilled and slots cut into the holes with a hacksaw, the extra spacers slipped onto the wires and wired into place so they will not slip out of the slots again.

Spacers about 18 inches apart should be adequate using the smallest size conduit available for the spacers. Unless the once popular 75 ohm twin feeder is available it is not possible to match the centre of a halfwave dipole directly as the 72 ohm impedance is too low to construct a line. This presents no real problem as the aerial centre can have a small gap which is a higher impedance and thus match the line impedance.

At the other end, we find our piece of wizardry has an output impedance of 50 ohms unbalanced and this, in turn, implies that an aerial tuning unit is required. At the very least it is necessary to use a balun. Why not use one giving a 4:1 impedance step up and, hey presto, the problem is solved. A well balanced line, coupled through an ATU and correctly matched to the aerial, should cause very little TVI or BCI.



Left: Teeing Tail to Aerial. Right: Covered Earth Wire to Tail.

If a tail from the aerial and the feeder are brought together after twisted joints as described, they can be twisted together and soldered with no problems as the strain has been taken off the wire before it is soldered. In such an aerial as a centre fed open wire dipole or a G5RV type, it is easier to make up the aerial as one component and then construct the feeders as a separate unit. Some layouts lend themselves to a separate feeder run from the shack to a post below the aerial after the style of a telegraph line, then another length of feeder is run from the centre of the aerial to join the feeder line at the post. This style of construction with 600 ohm feeders was the ideal before the arrival of a cheap and plentiful supply of coaxial cable. They worked, and worked well, but seem "old hat" these days.

A very popular type of balanced feeder can be made from 300 ohm TV ribbon, particularly for feeding a folded dipole made from the same material. If 300 ohm ribbon is used it is preferable to get some of the heavy duty variety as it is a lower loss type. Again, don't send a boy on a man's errand and construct the feeders from bell wire. At the other extreme, do not use massive great cables as these will only add weight where it is not wanted — in the centre of the aerial system.

The other type of feeders are the unbalanced types. This means coaxial cable in the majority of cases. It is possible to have unbalanced feed with wire feeders quite easily such as the old fashioned Windom aerial and wire feeds to vertical aerials. For the wire types of feed the same general remarks apply as for balanced systems. One point to remember is the possibility of increased TVI and BCI with this type of open wire feed.

Because the RF field in a coaxial cable is confined to the space between the inner and outer conductor, the possibility of TVI is greatly reduced. Coaxial cable comes in a great range of types, impedances and power handling ability. Mostly, they are of low impedances in the order of 50 to 75 ohms. This suits the output of the transceiver admirably and one could be pardoned for thinking one was designed for the other! The centre of a dipole aerial can be fed directly with coaxial cable, but this unbalances one half of the aerial. It will work, but with a much greater chance of TVI and reduced efficiency. This problem is easily solved by mounting a 1:1 balun right at the aerial feed point. I personally dislike this method as there is no attenuation of harmonic radiation if the aerial is a multiband type. For this reason, I favour the use of an ATU between the transmitter and aerial. Failing this, install a switchable low pass filter in the feed and fellow amateurs shall heap blessings on you for reducing your harmonics and they may not complain to the RI as was their wont before.

Coaxial cables have some odd characteristics that must be pandered to if a happy and long life is expected from them. Firstly, they suffer from "cold flow", which means the polythene insulation will distort if strained in position for a long period of time. A typical example is the tendency for the inner conductor to gradually work through the insulation if the radius of a bend is too small. It may not short, but it will create problems with the SWR for sure. For this reason, keep the radius of all bends in the coaxial cable as large as possible.

For the same reason it is advisable to support the coax on a strain or support wire where it has a long run unsupported to an aerial. There are places where this is impossible and the coax must swing in space.

Allied with cold flow, in these cases, is the fact that continued swaying of the cable may break the inner conductor. Run a strain wire and tape the coax every couple of feet to the strain wire so that the weight is taken by the strain wire. It is also a very good idea to support a long vertical down drop of coax in several places if possible.

The inner insulation of coaxial cable (polythene) is very susceptible to the action of sunlight and should never be left with the outer stripped from any more than a temporary period. After prolonged exposure to the sun, the insulation cracks and the insulation begins to look like a large number of washers slipped over the inner conductor. Particularly in a salt or corrosive atmosphere the insulation resistance drops alarmingly and the cable end is nearly useless. This can usually be rectified by cutting the end of the cable back until a proper insulation is restored, but a section of the cable is lost! The same treatment will usually remedy a cable which has poor insulation due to moisture penetration from one end. Again, a penalty is paid in the reduced length of cable.

The obvious approach is to prevent the problem before it occurs — cover the polythene insulation in some manner. The easiest answer is to coat the insulation with some material like Silastic® or similar. Silastic has the property of chemical reaction with the polythene but I have used it without any major trauma. A better material, though somewhat messier, is windscreen sealant. This remains chemically inert. Another approach is to cover the polythene with PVC sleeving and seal each end.

Another problem arises when joints are made in coaxial runs. These are usually made by connecting two male connectors through a "through" connector. With constant exposure to the weather, moisture finds its way into the connectors and affects their insulating properties. To prevent this disaster occurring, the connectors and a small length of coax can be taped with a self-sealing tape. This has the property of sealing to itself and becomes an homogeneous mass after a few days. There are many types of this tape available and they can also be used to cover the polythene inner insulation. To remove the tapes, carefully operate on them with a sharp knife and the connectors will be revealed before your startled gaze in their pristine purity again.

It is advisable to remove the strain from connectors joining coaxial lengths, otherwise the cable will probably pull out of the connectors. Do not relieve the strain by tying a knot in the cable although this will relieve the tension satisfactorily. It leaves the cable under stress with a radius which is too tight. Cold flow problems will appear with time. It is much safer to make a loop either side of the join.

A cunning way to defeat the bad habits of cockatoos and galahs (feathered bird types) eating and tearing the coax with their powerful beaks is to thread the cable through 1.25 inch, or larger, plastic conduit. This is too large for "cockie" to fit inside his beak so he can neither chew the conduit or the coax. (Thank you to VK4ZAR for this handy tip).

It pays to check coaxial cable carefully as there are some "El Cheapo" varieties which have a small number of strands of copper wire woven into the outer conductor. These are probably okay for HF or CB operation, but the losses increase with frequency and are useless at 432 MHz. It is worth remembering that coaxial cable attenuation increases with frequency. Whilst not a problem at HF, the losses at VHF may dictate the use of a low loss type, even at a much greater price, as is witnessed with the common use of Heliax® types of cable at 432 MHz. This is definitely not the place for cheap cable!

Another source of cable that it pays to check thoroughly is the secondhand and disposals type. Some excellent bargains are available but there can be some "pups" sold in this field. It does pay to try to find out the previous history if possible.

TV 75 ohm types are usually dependent on an aluminium foil shield for the outer conductor with a couple of copper wires running the length of the coaxial cable for outer connections. These are meant to be rigidly mounted to prevent swaying or flexing from breaking the foil outer. It is not really recommended for amateur use.

CONCLUSION

In concluding this series, I would like to acknowledge the work of G3UDO, in *Amateur Radio Today*. From these articles I was able to save myself the calculations on how much concrete weighed, etc.

I would also like to say that it is a case of "Don't do as I do, do as I say" as my present aerial layout is the classic case of before and not after! As all amateurs have said, "I'll fix that before Christmas." But, which Christmas? If you take due note of what I have said you may be on air with your new "U-Beaut" aerial system by the same Christmas, in time to work me and tell me where I went wrong in these articles. In the meantime, don't get tangled up in your aerial system and happy operating with plenty of DX.

—Photographs courtesy VK4ZDK

® Registered Trade Names

ar

Safety Around the Shack

David A Pilley VK2AYD
15 Forest Glen Crescent, Belrose, NSW. 2085

How electrically safe is your shack?

Within minutes of reading an interesting article in the February edition of the RSGB journal *Radio Communication* under the title "Safety in the Shack" I read a very sad story in the *IEEIE Monthly News* of an 18-year-old gifted musician who was killed whilst performing at a local discotheque. It appears he received a fatal shock when he touched externally live amplifying equipment and an earthed microphone.

How electrically safe is your Shack?

Are you one of those unfortunates whose house was built around minimum cost and, in consequence, you only have one power outlet in the shack from which you hang numerous extension blocks? You are not alone.

On a hot summers night, do you pad around your shack barefoot?

Have you given any thought to the potential danger our wonderful hobby brings us close to? Most of us probably think the main household general purpose outlet (GPO) fuse is sufficient safety. It is for equipment — not for your life.

In recent years there has been a growing concern for electrical safety. Already some local authorities are including special requirements that necessitate special devices, known as Earth Leakage Circuit Breakers (ELCBs) to be fitted on new buildings and on building sites wherever portable tools and appliances are used. In some countries such as Germany, it is mandatory to have an ELCB (or an RCCB as they are known there) fitted to all new bathroom outlets.

A search of the Australian Standard Association revealed two very interesting publications. MP30-1972 is a report on effects of electrical current passing through the body and AS3190 provides the approval and test specification for current operated (Core-balance) earth leakage devices.

Before getting into the technicalities of how an ELCB operates, let us look at the effects of electrical shocks and just how much our body can withstand.

Our Body

There are four major factors which determine the seriousness of an electric shock.

1 The path taken by the electric current when one sustains an electric shock.
2 The amount of current which flows.
3 The duration of the time for which the current flows and
4 The electrical resistance for the path taken by the electric current.

The most dangerous current path and the one where most electrocutions occur is that path which embraces the heart. This is usually hand to hand and hand to foot. (See Figure 1).

Time and current are the next important factors. Figure 2 shows the zones of effect of AC current (50/60 Hz).

Zone 1 represents an area where no reaction normally occurs, in fact the person is usually unaware of the passage of current through them.

Zone 2 is an area where the person will be aware of the shock, but usually no pathophysiologically dangerous effect will be experienced. Painful muscle contractions are likely at the high side of the curve.

Zone 3 is an area where usually no danger of fibrillation but other dangerous effects may be experienced.

Zone 4 is an area where a possibility of fibrillation exists (up to 50 percent probability).

Zone 5 is an area where a danger of fibrillation exists (greater than 50 percent).

"Fibrillation" is an abnormal conditions of the heart when the normal rhythmic expansion and contractions of the heart muscles takes place. In fibrillation the heart is not capable of pumping blood. If this condition is not corrected quickly death will result.

Perhaps an easier way to understand this is to look at the illustration shown in Figure 3. The general accepted level of current for external body contact is about 1 mA. At that value of current, a slight tingling sensation is perceived. At approximately 9 mA, we reach the "let-go" threshold and our brain commands us to release the shocking source. With increasing the current we reach a condition where we are unable to release ourselves, the "non-let-go" threshold, from the shocking source and eventually we have constriction of the therasic muscles and death can occur.

Time is, of course, most critical. Persons have sustained electric shocks in excess of the non-let-go threshold for very short periods and have lived to tell the tale. However, so often there is no one around you to break the power. Perhaps a better way of understanding the time period is to look at a standard electro-cardiogram of one pulse beat of the heart. (See Figure 4). The period when normal pumping action occurs is during the QRS phase. Immediately after this period we have the partial refractory T-phase, or rest period, of the heart just prior to commencing the pumping cycle again. Taking an average pulse rate of 80 beats to the minute, we have the duration of one cardiac cycle as being 750 milliseconds. The period of the partial refractory. or T-phase, is about 20 percent of the overall period, about 150 milliseconds.

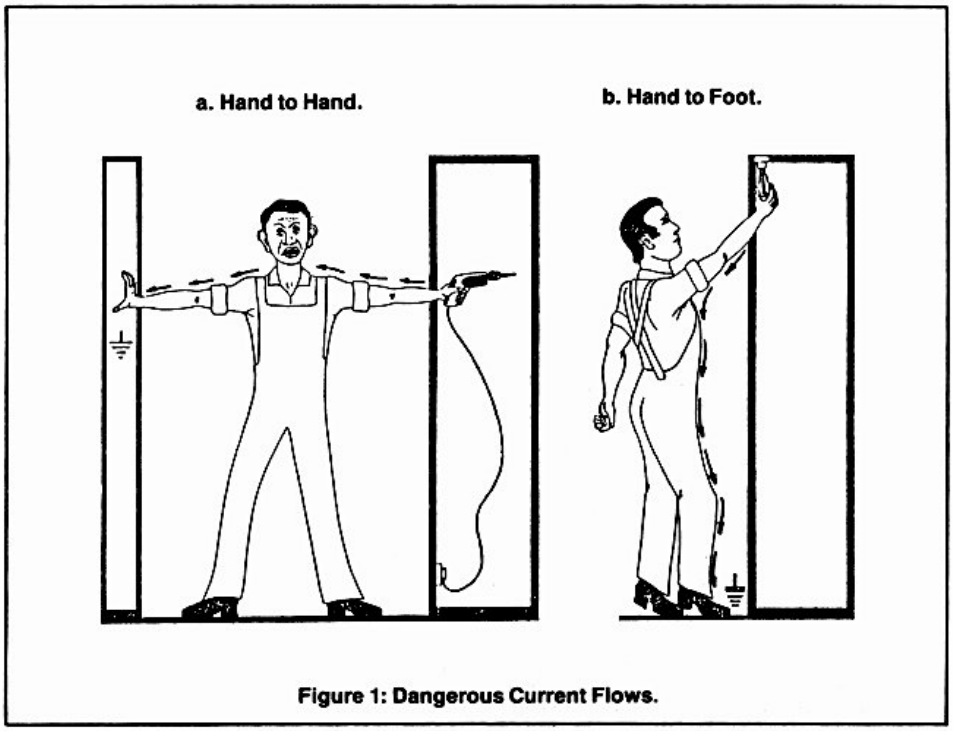


Figure 1: Dangerous Current Flows.

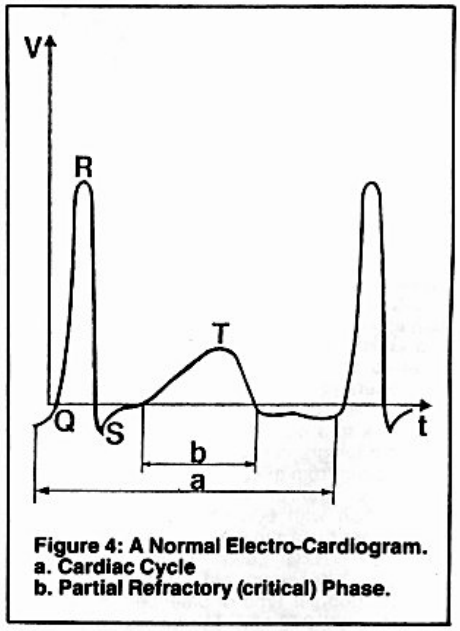


Figure 4: A Normal Electro-Cardiogram.
a. Cardiac Cycle
b. Partial Refractory (critical) Phase.

Should a person be subjected to an electric shock, and draw a current in excess of the ventricular fibrillation threshold current, death could occur if the current is high enough and that current is sustained for as brief a period as the duration of a cardiac cycle, ie 750

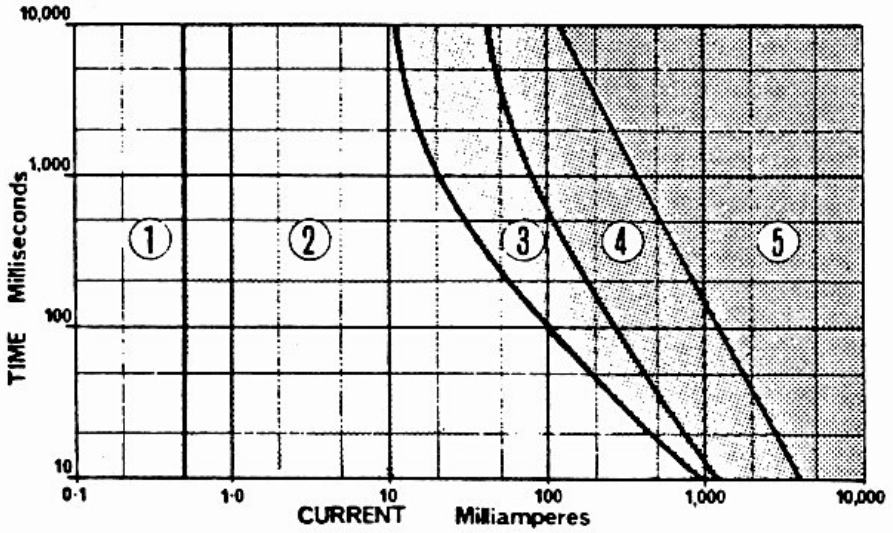


Figure 2: Zones of effects of AC Current (50/60 Hz) on Adult Persons.

current the curve separating zone 3 and 4 in Figure 1, shows a time of 300 milliseconds.

We talk glibly about dangerous voltages. We say "well 50-volts is not so bad, 110-volts, well when I was an apprentice in the workshop, if I couldn't hold 110-volts I was chicken, 240-volts, well you get a shock and 440-volts, that could be dangerous." Foolish talk — it is **current** that kills and a person can be as easily electrocuted with 110-volts as they could with 440-volts.

Reduce Shock Risks

Two very important rules:

— Always ensure the current carrying circuit is insulated from the frame of the appliance and
— The appliance frame is earthed or is double insulated.

Taking such precautions do not necessarily mean protection against shock, especially to the amateur who is constructing and testing equipment.

Australians are fortunate in having Electrical Safety Standards which are one of the highest in the world and yet the incidence of fatal electrical accidents are also among the highest in the world. A large number of fatal shocks experienced in the domestic situation involves appliance cords and extension cords. Due to the nature of its use, flexible cord and its

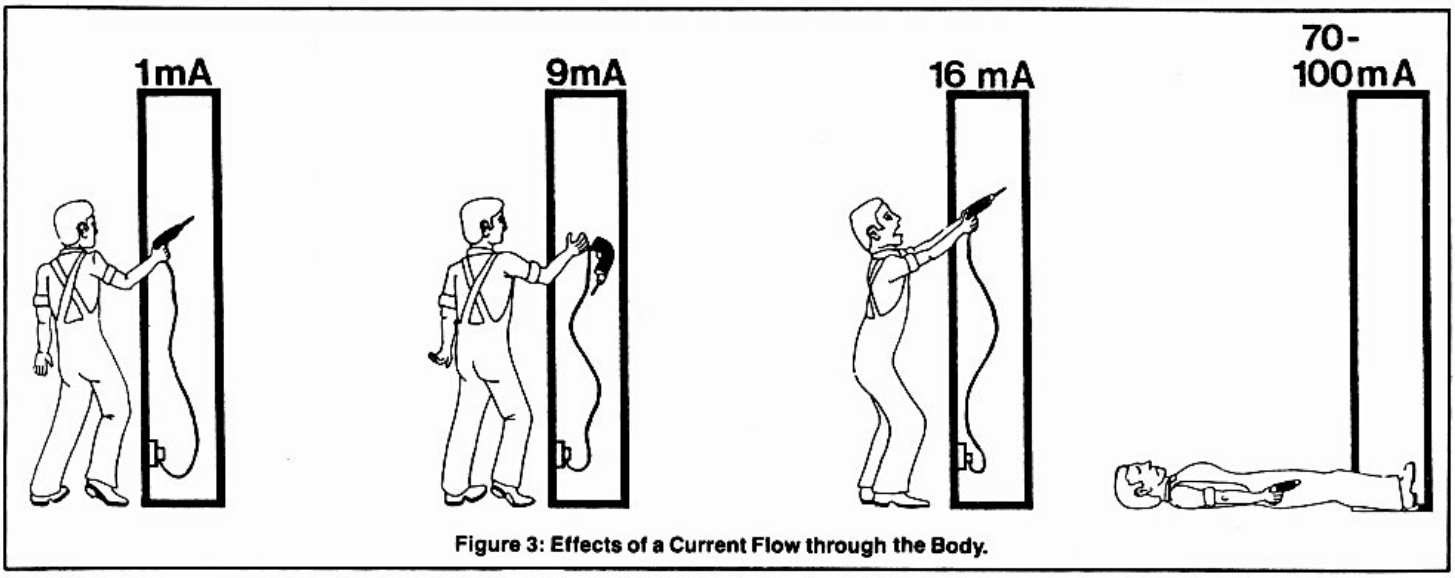


Figure 3: Effects of a Current Flow through the Body.

milliseconds, or even as brief a period as the duration of the T-phase, 150 milliseconds, if the shock coincides.

Frightening, isn't it!

The fourth most important factor to consider in determining the seriousness of the electric shock is the electrical resistance of the body. We are primarily liquid.

As a conduction of electricity, the human body is made up of two major paths. The upper layer of the skin, or epidermis, which is of relatively high electrical resistance, and the tissues, muscles, etc, which lie below the outer skin surface which are of relatively low resistance. Our upper layer of skin is our first barrier of defence. A person with a dry, calloused skin presents higher resistance to shock than a person with a soft skin. Figure 5 illustrates the minimum body resistance levels for external contact with electricity and a current path hand to hand or hand to foot. The relationship of current to voltage is not linear because the body resistance varies with the touch voltage, or breakdown of skin, at increased potentials.

A person with a moist skin, at 250 volts, has a resistance of approximately 1000 ohms, which means we are considering a maximum leakage current through the body of 250 mA. At this

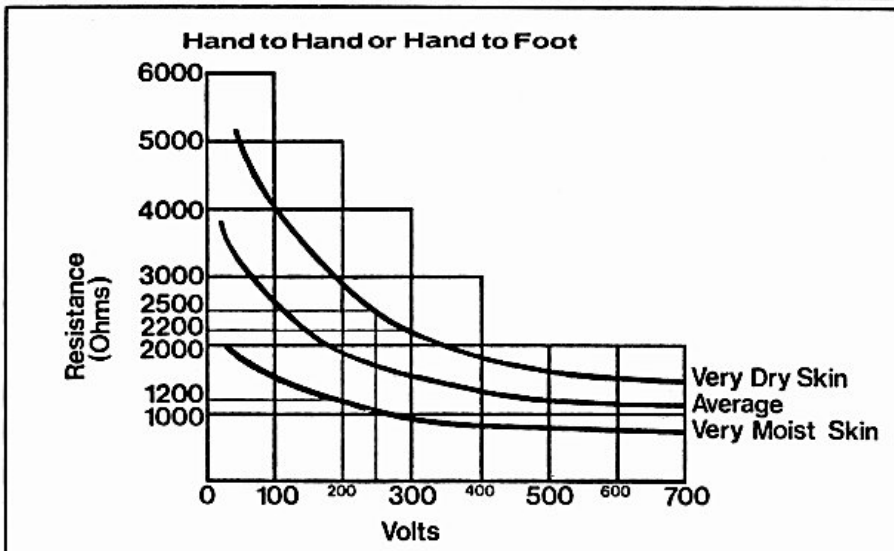


Figure 5: Resistance of the Human Body — Hand to Hand or Hand to Foot.

fittings are more susceptible to damage than permanent fixed wiring.

Wrongly wired plugs are not uncommon and often the unsuspecting user is closer to electrocution than imagined. Statistics show that about 80 percent of electrocutions which occur in the home involve the flow of current through the victim to earth. Persons are not normally accidentally electrocuted between phases or between phase and neutral. Persons electrocuted in this way are persons who normally set out to commit suicide.

Consequently a line of defence is to install an Earth Leakage Circuit Breaker — a device that will trip within 30 milliseconds of detecting current leaking to earth.

To overcome the high sensitivity required, most ELCBs use a polarised release which is capable of being actuated directly by the core output. This highly reliable device has the advantage of being only current sensitive and therefore does not require mains voltage excitation and consequently can operate under any voltage condition.

Sensitivity

It would appear that the maximum sensitivity should be 10 mA, however it is more common to use 30 mA for general applications and the 10 mA being restricted to such sensitive areas as bathrooms. Both types are readily available on the market with Approval Certificates from the Energy Authority. Generally the 30 mA types trip around 26 mA and the tripping time is around 30 milliseconds. AS.3190 states the protective device tripping time should not exceed 100 milliseconds.

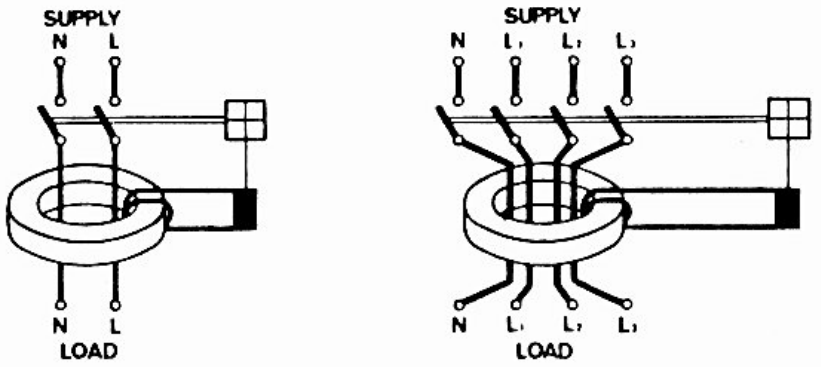


Figure 6: Diagram of the Principle of Core-Balance Protection.

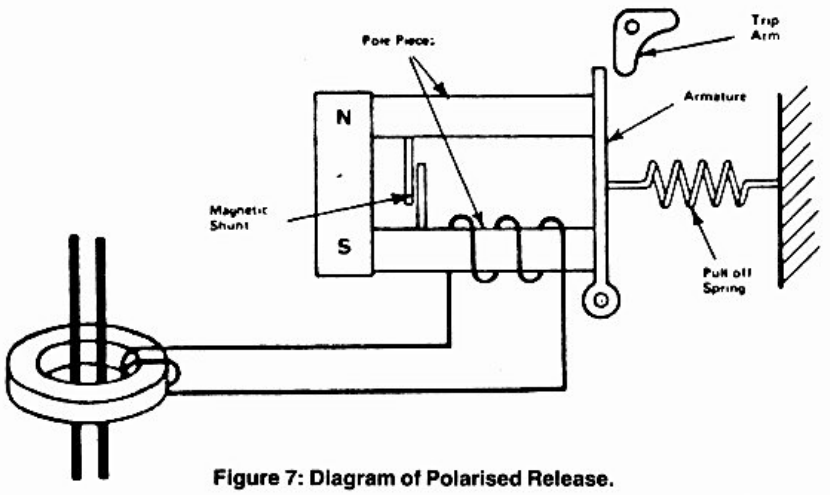


Figure 7: Diagram of Polarised Release.

The Earth Leakage (Core-Balanced) Circuit Breaker

The core-balanced device has emerged as providing the means of detecting very small earth leakage currents. As the name implies, these devices operate on the principal that the flux in the toroidal transformer is balanced under normal healthy conditions; ie the current flowing in the Active wire is equal to the return current in the Neutral wire. Should there be an imbalance because current is leaking to earth, or returning through some other means, then a magnetic flux will be generated in the core. A secondary winding on the core will have a voltage generated in it proportional to this out-of-balance flux and, if it exceeds the standard set, it will trip the breaker. See Figure 6 and 7.

Installation

Before discussing installation we should first understand how our electricity is supplied to our residence or business. Here in Australia we use a system known as MEN, which is the abbreviation for Multiple Earthed Neutral. The main supply (240-volts) is derived from a transformer, the output of which is in a three-phase star configuration. The centre of the star is Neutral and is bonded to earth. When the 240-volt supply arrives at your domestic consumer distribution board it has an Active wire and a Neutral. The Active is connected to the Supply Authority fuse, passes through your consumption meter, to an isolating switch, and then to various fuses, MCBs. The Neutral wire is connected to a Neutral block and an independent earth wire is connected to the same block, meaning that, at this point, the potential voltage is virtually zero.

The house wiring, which is normally three wires comprising an Active (A), Neutral (N) and Earth (E). Both N and E are terminated on the same terminal block at the Distribution Board, but not, of course, connected together at the General Purpose Outlet.

Installation of ELCBs are normally at the Distribution Board, however, when selected protection is required; eg in the shack or around the swimming pool, separate units can be installed. When an ELCB is installed the "load" Neutral must be independent from the supply Neutral and Earth. A typical installation is shown in Figure 9. If you decide to provide ELCB protection at the Distribution Board, you may want to consider selected circuits; eg GPOs, Swimming Pool, Bathroom, Laundry, etc, and leave such things as the Water Heater independent. Figure 10 shows typical wiring of a combination of protected and unprotected circuits.

If you have an outlet in your shack and you do not want to modify your Distribution Board, then consider a small portable unit. These usually have at least two socket outlets and you can still hang your extension blocks on them knowing you have protection.

It must be remembered that you no longer have an Earth wire from the Distribution Board connected to your equipment. Your RF or independent earthing installation is now isolated from the mains Earth. If you use a portable unit, ensure that no other equipment in the shack is connected to any other supply outlet. The UK regulations state — "No metalwork bonded to the main earthing terminal in the Consumer Distribution Unit is allowed within two metres of the radio equipment, this includes things like radiators, electric fires, kettles, etc, which are not connected to the RF Earth is mandatory."

The shack RF Earth, (we hopefully all have them), must have a low resistance. Make sure you use generously sized conductors.

How Much Equipment per Unit?

The ideal would be to have one core-balance unit per piece of equipment, however economic considerations prohibit this. To go to the other extreme and having one unit supplying a whole installation is also not wise as it is likely to introduce operating difficulties. Nuisance tripping can be troublesome. A typical example is a poorly designed fluorescent lamp switching that can create current spikes at switch-on. To overcome this, some manufacturers, such as Utilux and Scanelec have introduced a high current carrying capacity device with a tripping circuit roughly tuned to the power frequency. (Tripping current is still 30 mA). This unit attenuates any high frequency components. Alternatively, there are components that can be fitted to fluorescents that will damp out the spikes.

As the limiting number of GPOs that can be attached to a single ELCB unit can be as high as 50, it should not worry the average home user.

ELCBs are quite small. The Scanelec portable Safeguard unit is about 120 x 140 x 90 mm and the ELCB in an enclosure for fitting into a Distribution Board is 75 x 125 x 75 mm. Price for a portable unit is around $110 and for a Distribution Board unit, around $102.

Warning

ELCBs only protect you against electric shock

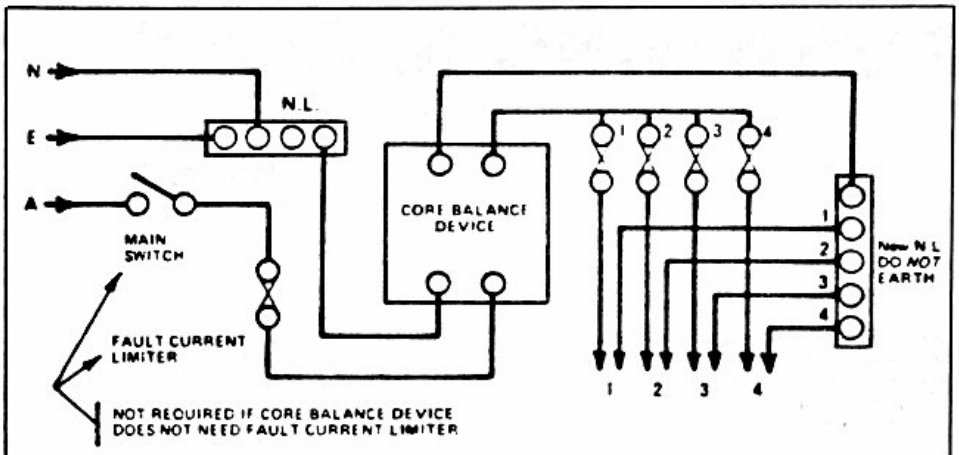


Figure 9: Typical Correct Installation of Core-Balance Device.

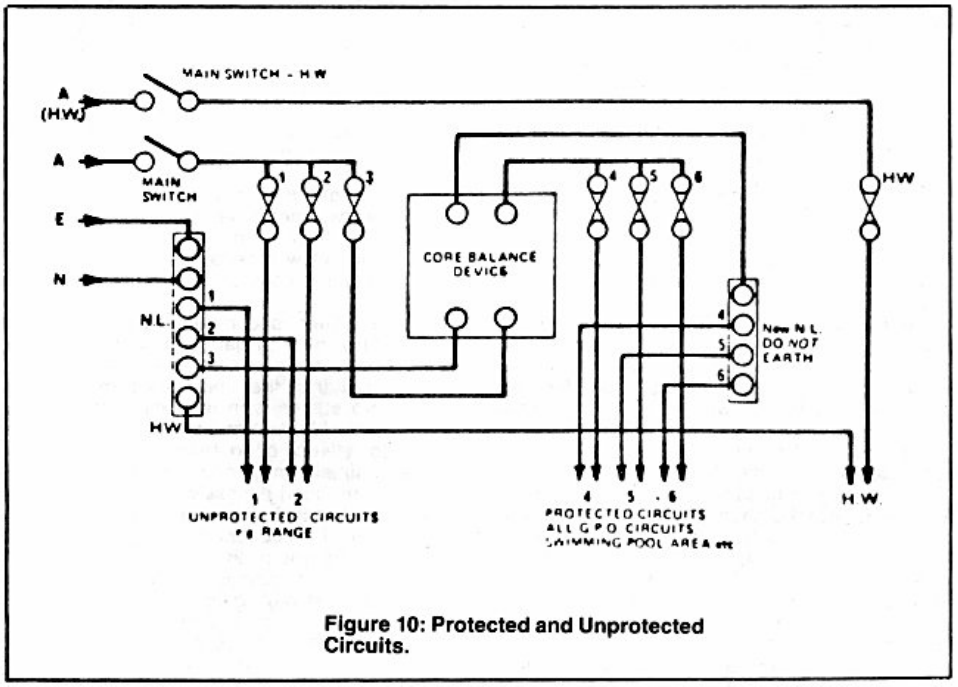
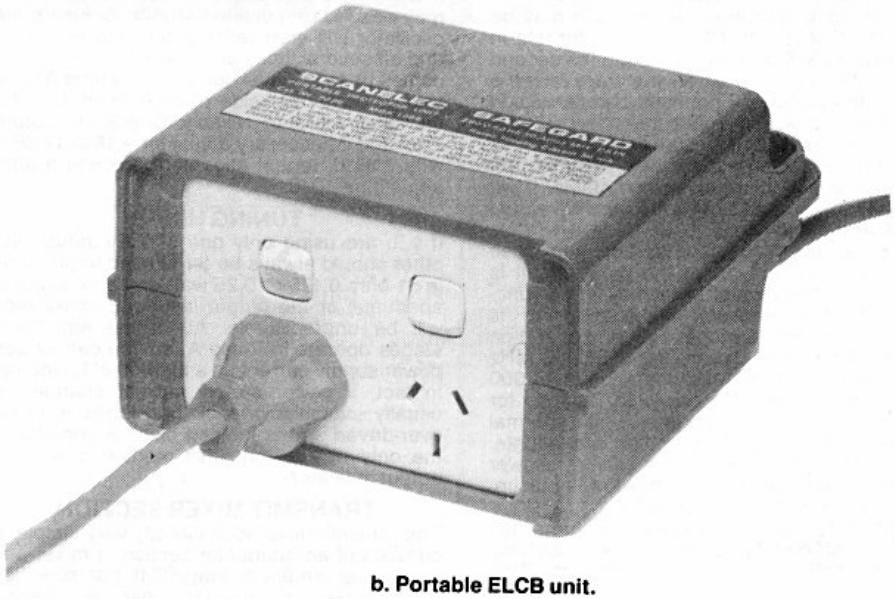


Figure 10: Protected and Unprotected Circuits.

a. For Consumer Distribution Board Mounting.

Examples of ELCB Units.



b. Portable ELCB unit.

from current passing through the body to Earth. An ELCB does not provide protection should you come in direct contact with both Active and Neutral conductors, without passing current to Earth.

It is not a substitute for a fuse or equipment overload protection.

It is also not a substitute for sensible and safe electrical practices in the use of any electrical product.

Complete technical information and application notes can be obtained from the writer at PO Box 231, Frenchs Forest, NSW. 2086.

Acknowledgments: RSGB, EPC Ltd, Utilux Pty Ltd, The Standards Association and R Thomson.

YES! The writer uses an ELCB in the shack!

WARNING: Any electrical circuit modification has to be carried out by an approved electrical contractor — regulations vary from State to State.

Please consult your supply authority for advice.

ar

VHF-UHF BUILDING BLOCKS

Part 2

John Day VK3ZJF
5-7 Old Warrandyte Road, Donvale, Vic. 3111

MODULE A: TWO-METRE TRANSVERTER BUILDING BLOCK

Part one of this series presented the broad outline of this new series of construction projects. In this instalment it is intended to discuss the design problems of the two metre transverter and present a design for a complete 100 mW unit. Printed circuit layouts and details will appear later.

When considering the design of transceiving or transverting equipment several important facts should be borne in mind.

1. For best performance the major bandwidth determining element of the receiver should be as close as possible to the first mixer.

2. To achieve good large signal handling capability the level of spurious responses and phase noise on the first injection oscillator should be as low as possible.

3. Gain before the first mixer should be kept as low as possible.

The first stage in the chain is the preamplifier, it should have a low noise figure (<2 dB at 144MHz), be relatively narrow band and have a good (high) third order intermodulation intercept point (large signal handling capability).

Next comes the most important section of all, the first mixer and the injection oscillator. If the signal from the oscillator is not relatively free from phase noise then the overall performance of the receiver will be degraded. For optimum performance the mixer should have a high injection level (+7 dBm or greater), be accurately terminated on all ports and be followed by an amplifier that can easily handle the large signals occurring out of the nominal passband until the main filter is reached.

INJECTOR OSCILLATOR CHAIN

Two variations on the oscillator chain may be built, the first for 116 MHz injection for use in converting 28 MHz to 144 MHz and the second for 94 MHz injection when the transverter is used with a 5o MHz IF. For ease of construction and testing it was decided that the oscillator should be kept below 100 MHz. At these frequencies it is possible to use designs that are easy to get going, clean and stable. If we were to run the oscillator at 116 MHz life would be a little more difficult.

The oscillator, A1Q1, is a common base Butler arrangement, L1 in the drain circuit is resonant at the crystal frequency in conjunction with the feedback capacitors and is necessary to ensure proper overtone operation of the crystal. The crystal, Y1, is 58.000 MHz third overtone for 116 MHz operation or 94.000 MHz fifth overtone. No provision is made for adjusting the crystal frequency, the normal tolerance of the crystals specified is adequate. The oscillator is followed by a source follower buffer (A1Q2) which drives the low input impedance of the frequency doubler.

Rather than use an active doubler (transistor, FET or MOSFET), a full wave rectifying doubler (A1D1 and A1D2) was chosen. This arrangement, although having a significant insertion loss, of typically 5-7 dB, is trouble free in operation, requires no alignment and gives better suppression of unwanted output products. The trifilar input transformer (A1T1) acts in the same way as a centre tapped power transformer, the two sections of the secondary deliver two outputs 180 degrees out of phase, thus the diodes pass alternate half cycles of the input frequency, resulting in output at twice the input frequency. Following the doubler is a pair of critically coupled tuned circuits to select only the desired output frequency and an amplifier (A1Q3) to raise the output level to +16 dBm to drive two diode double balanced mixers through a resistive power splitter/attenuator arrangement.

The power level from this module can be adjusted by varying the supply voltage to the first two stages. Regulator U1 provides nominal six volt regulated which can be varied with minimal effect on circuit performance. Power consumption of this module is approximately 60 mA at 12 volts regulated. The design was optimised for performance not low power consumption!

As previously stated, it is important that the diode double balanced mixers should see 50 ohms at all ports. By generating a significantly higher level of injection that is needed, the amplifier can be followed by a 3 dB resistive splitter giving two outputs of +13 dBm and a 6 dB attenuator for each mixer to give a reasonably closely controlled 50 ohm source for each.

If the chain is used for 94 MHz injection, the inductors must be changed (refer parts list) and a resistive attenuator is used in place of the doubler. Alignment is simple, apply 12 volts to the board, adjust A1R10 for six volts at the top end of A1L1, in the drain of A1Q1. Remove power and install the crystal on the board, connect a 50 ohm detector to the output and with power applied adjust all slugs for maximum power out. The oscillator tuned circuit may need to be adjusted slightly to ensure the oscillator will start reliably, turn the power on and off several times and check that the output comes up to full level quickly, if not tune A1L1 a turn or two either side of peak level until the oscillator will start reliably. Check the output level and if necessary adjust for +16 to 17 dBm with A1R10, repeat alignment procedure after adjusting A1R10.

TUNING HINTS

If you are using only one of the outputs, the other should always be terminated in 50 ohms (a 51 ohm 0.125 or 0.25 watt carbon resistor is adequate) or the output level and impedance will be unpredictable. All of the amplifying stages operate in Class A, so you cannot use power supply current as a method of tuning up. In fact, if power supply current changes, it usually indicates one of the stages is being over-driven and is leaving class A conditions, the only way to tune this module is with an output indicator.

TRANSMIT MIXER SECTION

The transmit mixer is inherently very simple. It consists of an attenuator section, a mixer and two power amplifier stages. If the specified SBL-1 mixer is operated near its nominal maximum input level (say 0 dBm) then the third order intermodulation products are only 30 dB below the desired output. This is marginal for most applications, by reducing the input level 10dB to -10 dBm (100 uW) the distortion products fall three faster becoming — 60 dBc (dB relative to desired carrier), a much more acceptable position.

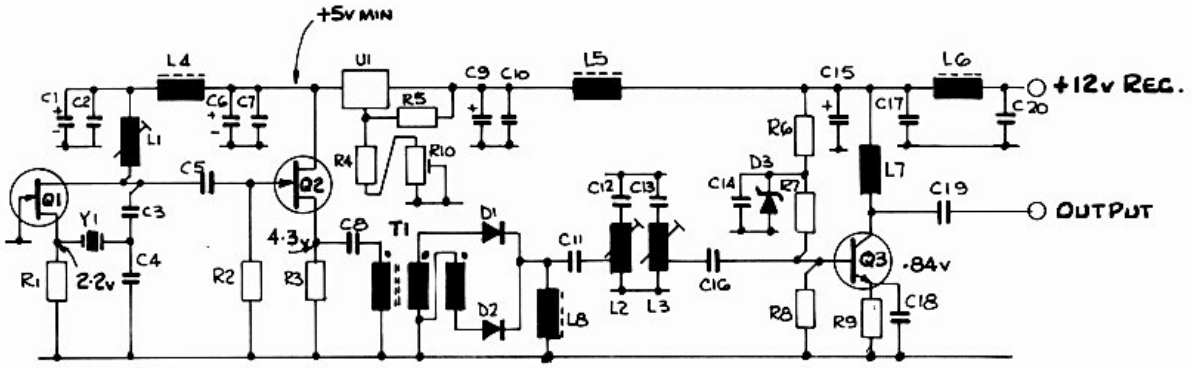
If you are using the transverter with the VK3AFQ transceiver boards then you will have a -10 dBm output available directly, if not then you will need to consult the table of attenuator resistors and fit the appropriate values for your application. The local oscillator input is fitted with a 6 dB pad as discussed earlier.

Output from the mixer is fed directly to a tap on the first of a pair of over coupled tuned circuits which are used to define the basic bandwidth of the transmit converter. The bandwidth of this pair is not sufficient to cover all of the two metre band but will adequately cover 144-146 MHz, the area it is expected to be used in. A low impedance tap on the second tuned circuit is coupled into the first amplifier stage.

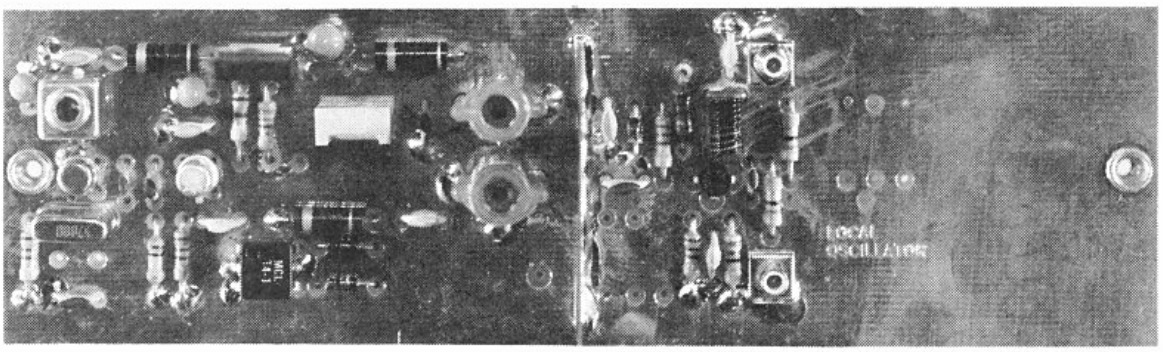
The amplifier used in this design is designed specifically for high gain with very low distortion. If anyone cares to take the time they would find that the impedance matching in these two stages is in fact only optimised on the output of the second stage. This has been done for a very good reason, if the devices were optimally matched the available gain would have been excessively high, this would have (and on the bench has) resulted in uncontrollable feedback. Dual gate MOSFET A2Q1 is operated in a fairly conventional manner, the ubiquitous BF981 is used here because of its high gain, low intermodulation and low noise which is almost as important in transmitters as receivers. The tuned circuit with capacitive tap in the drain is resonant at the operating frequency but provides a non optimum match as discussed. It is ABSOLUTELY ESSENTIAL that this inductor be screened or almost certain instability will result due to coupling from the output matching network.

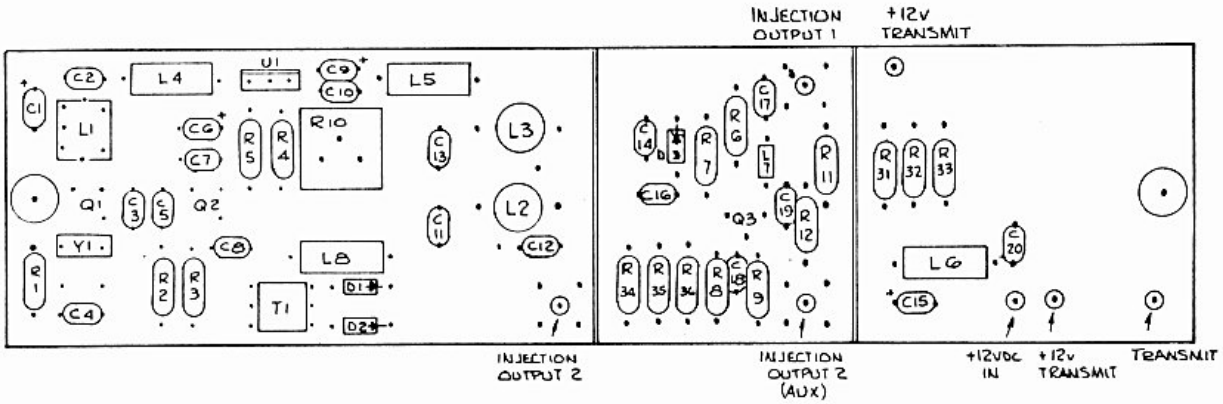
Output amplifier A2Q2 and its associated circuitry is the most complicated single stage in the entire transverter. The BFR96 transistor used here has an fT of approximately 5 GHz and has an unmatched gain of over 25 dB at two metres. Degenerative emitter feedback has been applied to reduce the gain and more precisely define the input and output impedances. A rather complex operating point stabilisation circuit is used to ensure the transistor stays firmly in Class A under all normal conditions. The output power from this stage is nominally +20 dBm (100 mW) with second harmonic suppression of over 50 dB and third order intermodulation products suppressed by a similar amount.

It is suggested that if you intend to build this stage other than on the PCB that has been laid out do so with considerable forethought due to the considerable potential for instability. On the other hand a number of prototype units have shown no tendency towards instability under any circumstances when carefully constructed.

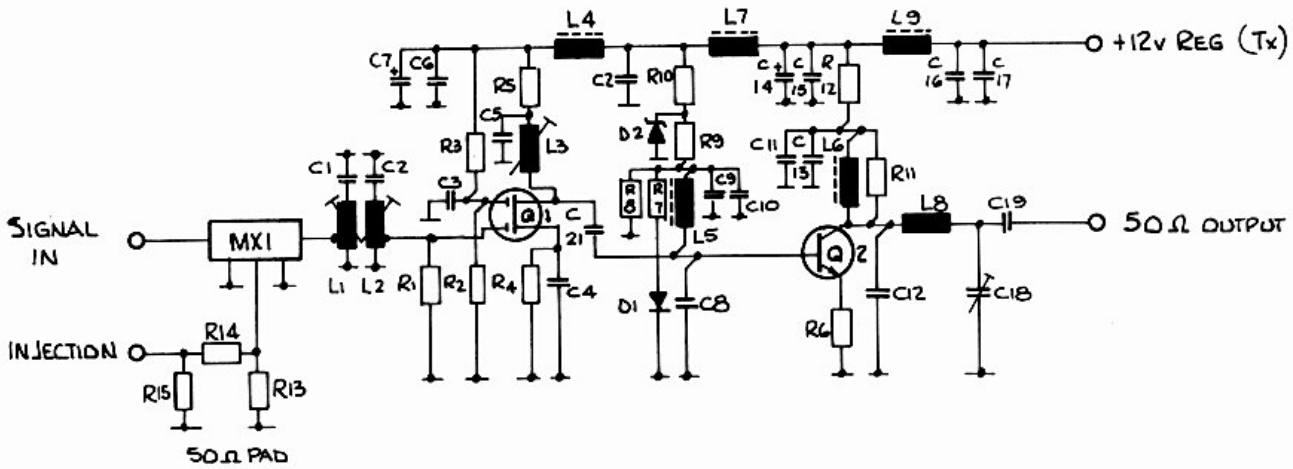


Module A Sub-assembly 1
Injection Oscillator
Module component designations are prefixed with A1

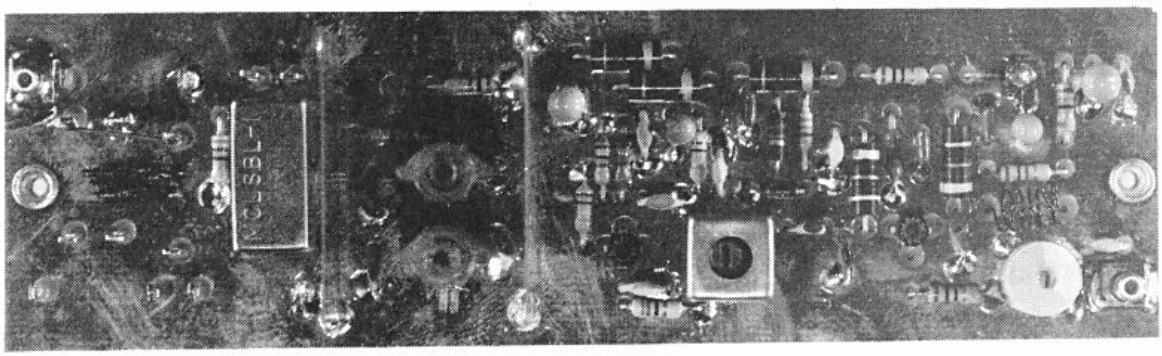


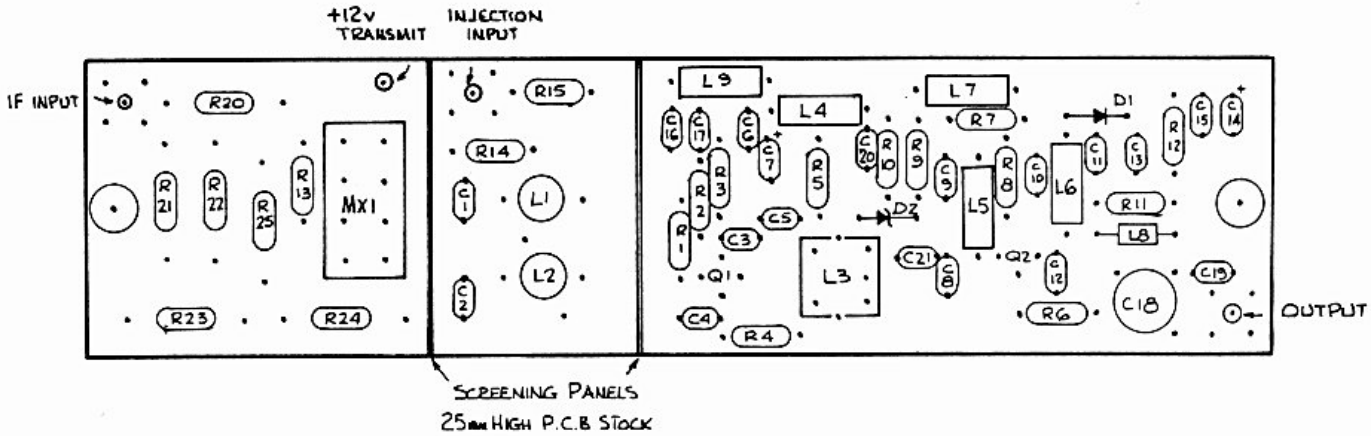


Injection Oscillator — Parts Layout.

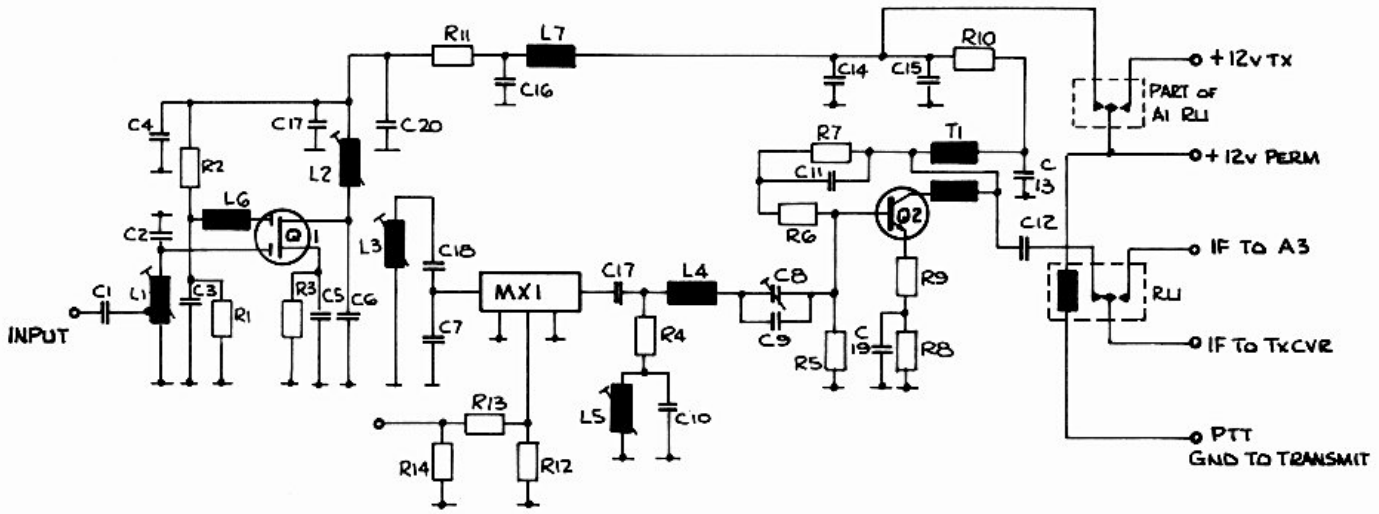


Module B Sub-assembly 2 Transmit Converter
Module component designations are prefixed with A2

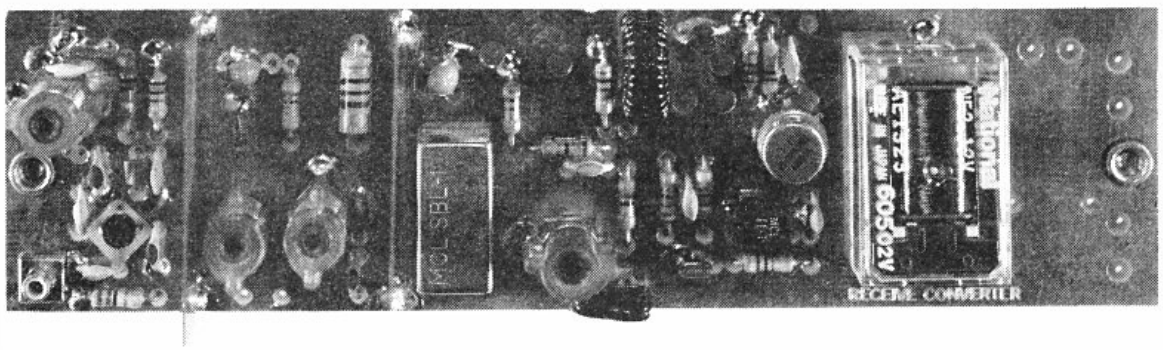


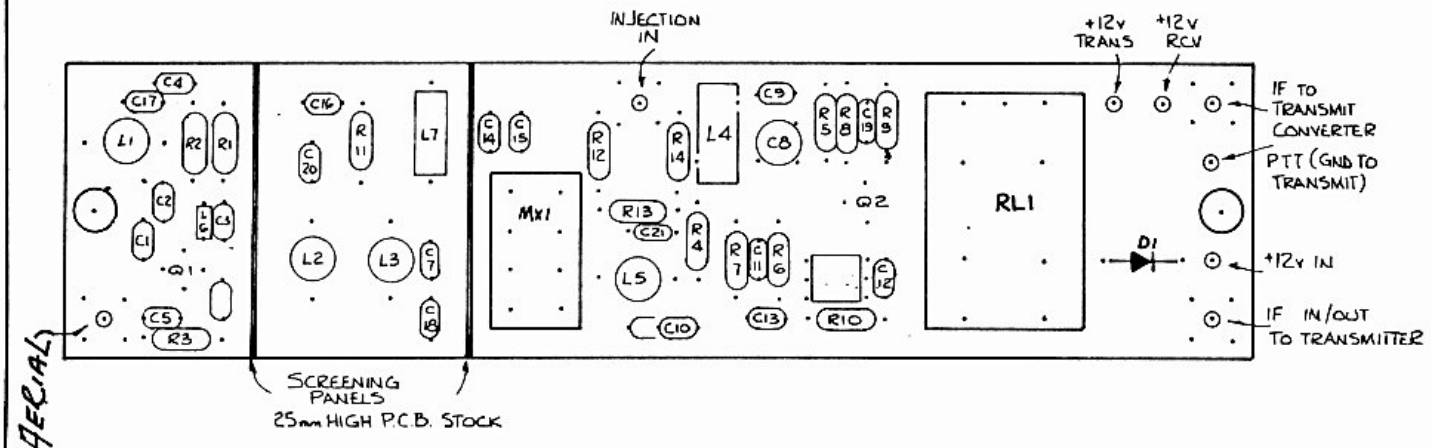


Transmit Converter — Parts Layout.



Module A Sub Assembly 3 Receive Converter
Module component designations are prefixed with A3





Receive Converter — Parts Layout.

RECEIVE CONVERTER

This final segment of the two metre transverter is in fact the most simple. The line up is absolutely classical and no attempt has been made to 'fool around' with a design that has proven immensely successful for many two metre enthusiasts around the world. As in the successful converter design by Harold VK3AFQ, no attempt has been made to 'noise match' the input. It was found that no improvement could be measured unless great care and patience was taken and was thus not considered worthwhile.

The operating point of the BF981 should be set at Id = 10 mA for close to optimum noise performance. Following the amplifier is another pair of coupled tuned circuits, the output of the second being capacitively tapped to drive the mixer.

Much has been written over the years about methods of providing good broadband 50 ohm terminations for double sideband mixers. The technique to be used is known as a bandpass/band stop diplexer. Essentially this is a good type of filter that provides a band pass action with a good 50 ohm characteristic at the input over a wide band of frequencies.

IF Amplifier stage Q2 and its associated components form a broadband Class A amplifier with shunt and series feedback. Not only does this give good overall performance but this stage has a reasonably well defined input impedance of approximately 50 ohms. A signal at the output of the mixer at the IF frequency will be passed to the amplifier by the bandpass element of the diplexer (A3L4, A3C8 and A3C9). At the IF frequency the impedance of this circuit is low allowing a low insertion loss of approximately 0.75 dB on the prototypes presently made, the shunt arm of the diplexer (band stop) will have a higher impedance and thus have little effect. As the frequency moves away from the IF, such as for images and spurious responses, the series arm impedance will rise while the shunt arm impedance will fall. This will mean little energy will be transferred but a good 50 ohm match will remain due to the presence of A3R4.

A single tuned circuit in the drain of Q2 is tapped for approximately 50 ohm output impedance to drive the following receiver. As in the case of the transmitter, a 6 dB pad is provided on the mixer LO port.

ALIGNMENT

Having ensured that the local oscillator is working and with the appropriate selection of A3L4, A3L5, A3C8, A3C9 and A3C10 from the option table for your IF frequency you may now proceed to the alignment of this module. With the IF connected and a signal source connected and tuned in, preferably using a beacon or another amateurs signal. Tune A3L1, A3L2, A3L3, A3L5 and A3C8 for maximum signal strength. If a very weak signal is available A3L1 may be optimised for noise figure. This point will not occur at the best gain setting. Simple isn't it, your two metre converter is now working!

CONSTRUCTION

The printed circuit boards for Modules A1, A2 and A3 can be made available in a single piece. If this is done then most of the required interconnection is already done for you. All that needs to be supplied externally is an insulated connection from the 12 volts DC input terminal on the receive converter board to the 12 volt DC input on the LO module. Apart from some means of switching the antenna side, these three modules now form a complete 100 mW two metre transverter.

PART LISTS — MODULE A

Sub-assembly 1, the Injection Oscillator

A1C1	4.7uF	16V or greater Tantalum
C2	10nF	Ceramic bypass
C3	22pF	NPO Ceramic plate
C4	100pF	NPO Ceramic plate
C5	10pF	NPO Ceramic plate
C6	4.7uF	16V or greater Tantalum
C7	10nF	Ceramic bypass
C8	1nF	Ceramic
C9	10uF	16V or greater Tantulum
C10	100nF	Monolithic Ceramic
C11	1n8	Ceramic
C12		See option table
C13		See option table
C14	10nF	Ceramic bypass
C15	4.7uF	16V or greater Tantulum
C16	100pF	NPO Ceramic
C17	1nF	Ceramic bypass
C18	1nf	Ceramic bypass
C19	22pF	NPO Ceramic
C20	100nF	Monolithic ceramic
A1D1	5082-2800	Hot carrier diode
A1D2	5082-2800	Hot carrier diode
A1D3	8.2V	400mw 10% Zener diode
A1L1		See option table
A1L2		See option table
A1L3		See option table
A1L4	22uH	Moulded miniature RF choke
A1L5	22uH	Moulded miniature RF choke
A1L6	10uH	Moulded miniature RF choke
A1L7		See option table
A1L8	15uH	Moulded miniature RF choke
A1Q1	U310	JFET (Do not substitute)
A1Q2	2N4859A	(Do not substitute)
A1Q3	BFR96	A BFR96S or BFW92 may be suitable
A1R1	220R	0.125W Carbon Film five percent
A1R2	100K	
A1R3	220R	
A1R4	750R	
A1R5	240R	
A1R6	330K	
A1R7	3K3	
A1R8	1K	
A1R9	33R	
A1R10	2K	Trim pot (Spectrol Model 63)
A1R11	15R	0.125W Carbon Film five percent
A1R12	15R	
A1T1		7 turns Trifilar 26 SWG on Amidon T25-43 core or MCL T4-1 Transformer
A1U1	LM317LZ	TO92 Voltage regulator
A1Y1		Third overtone crystal HC18/U holder, series resonant

Parts List - Module A - Sub-assembly 2, Transmit Converter.

A2C1	5.6pF	NPO Ceramic
A2C2	5.6pF	NPO Ceramic
A2C3	1nF	Ceramic plate
A2C4	1nF	Ceramic plate
A2C5	1nF	Ceramic plate
A2C6	10nF	Ceramic plate
A2C7	4.7uF	16V Tantalum
A2C8	12pF	NPO Ceramic
A2C9	1nF	Ceramic plate
A2C10	100nF	Monolithic ceramic
A2C11	100nF	Monolithic ceramic
A2C12	22pF	NPO Ceramic
A2C13	100nF	Monolithic ceramic
A2C14	10nF	Ceramic plate
A2C15	10uF	16V Tantulum
A2C16	100nF	Monolithic ceramic
A2C17	10uF	16V Tantulum
A2C18	45pF	Teflon film trimmer
A2C19	1nF	Ceramic plate
A2D1	1N914	or similar silicon diode
A2D2	5.6V	400 mW ten percent Zener diode
A2L1		48A227MPC Tapped 1.75T from cold end
A2L2		48A227MPC Tapped 1.25T from cold end
A2L3		5T 26SWG 4 mm Former (Must have shielded can)
A2L4	10uH	Moulded miniature RF choke
A2L5	1uH	Moulded miniature RF choke
A2L6	1uH	Moulded miniature RF choke
A2L7	10uH	Moulded miniature RF choke
A2L8		4T 4mm Diam Air core, spread 10mm (to fit holes)
A2L9	10uH	Moulded miniature RFC
A2MX1	SBL1	Mini Circuits Labs mixer
A2Q1	BF981	Dual Gate MOSFET (A MFE131 may work)
A2Q2	BFR96S	Trabsistor (do not substitute)
A2R1	100K	0.125W Carbon Film five percent
A2R2	10K	
A2R3	15K	
A2R4	68R	
A2R5	100R	
A2R6	10R	
A2R7	10R	
A2R8	680R	
A2R9	330R	
A2R10	270R	
A2R11	220R	
A2R12	15R	

PARTS LIST — MODULE A

Sub-assembly 1, Injection Oscillator

Part	92-94 MHz	116 MHz	
A1L1	8T 26SWG	7T 26SWG	Amidon L33-10 Former
A1L2	48A287MPC	48A227MPC	Miller coil Tap 1.75 turns
A1L3	48A287MPC	48A227MPC	Miller coil Tap 1.50 turns
A1L7	4T 26SWG	5T 26SWG	Close wound 5mm Air Core
A1C12	6.8pF	5.6pF	NPO Ceramic Plate capacitor
A1C13	6.8pF	5.6pF	NPO Ceramic Plate capacitor
A1Y1	92.000		52 MHz to 144 MHz
A1Y1	94.000		50 MHz to 144 MHz
A1Y1		58.000	28 MHz to 144 MHz

For 92-94 MHz operation leave out A1T1, A1D1, A1D2, A1L8 and put a wire link in as shown on layout diagram.

PARTS LIST MODULE A

Sub-assembly 3. Receive Converter

A3C1	1nF	Ceramic plate
A3C2	2.2pF	NPO Ceramic plate
A3C3	1nF	Ceramic plate
A3C4	1nF	Ceramic plate
A3C5	1nF	Ceramic plate
A3C6	4.7pf	NPO Ceramic plate
A3C7	68pF	NPO Ceramic plate
A3C8		See option table
A3C9		See option table
A3C10		See option table
A3C11	10nF	Ceramic
A3C12	1nF	Ceramic plate
A3C13	10nF	Ceramic
A3C14	100nF	Monolithic Ceramic
A3C15	10uF	16V Tantalum
A3C16	10nF	Monolithic Ceramic
A3C17	10nF	Ceramic
A3C18	4.7pF	NPO Ceramic plate
A3C19	10nF	Ceramic
A3C20	1uF	TAG Tantalum
A3C21	10nF	Ceramic
A3D1	1N4002	Or similar Silicon 1A Diode
A3L1	220nH	48A227MPC Miller coil (Blue)
A3L2	220nH	48A227MPC Miller coil (Blue)
A3L3	220nH	48A227MPC Miller coil (Blue)
A3L4		See option table
A3L5		See option table
A3L6	FC540	Amidon choke bead on lead of A3R2
A3L7	10uH	Moulded RFC
A3MX1	SBL-1	Mini Circuits Labs mixer module
A3Q1	BF981	Dual Gate MOSFET
A3Q2	2N3866	TO-39 Transistor
A3R1	10K	0.125W Carbon resistor five percent
A3R2	22K	
A3R3	33R	
A3R4	51R	
A3R5	1K	
A3R6	560R	
A3R7	3K3	
A3R8	100R	
A3R9	4R7	
A3R10	100R	
A3R11	100R	
A3R12	150R	
A3R13	39R	
A3R14	150R	
A3RL1	NF2-12V	National 2 pole 12V relay

DIPLEXER OPTIONS MODULE-A

Sub-assembly 3, Receive Converter

OPTIONS TABLE FOR IF DIPLEXER

From the following table you should choose a set of values for your particular IF frequency. If you need a set of values for another frequency you can calculate your own from information to be included later in this series.

IF = 10.7 MHz

A3L4	3.9uH	35T 22G T50-10 Amidon Core
A3L5	146nH	48A147MPC Miller coil (Orange)
A3C8	27pF	Teflon foil Philips trimmer
A3C9	51pF	Dipped Mica
A3C10	1500pF	Dipped Mica

IF = 28 MHz

A3L4	1.42uH	21T 22G T50-10 Amidon Core
A3L5	57nH	48A518MPC Miller coil (Brown)
A3C8	22pF	Teflon foil Philips trimmer
A3C9	10pF	NPO Ceramic plate
A3C10	510pF	Dipped Mica

IF = 52 MHz

A3L4	765nH	16T 24G T37-10 Amidon Core
A3L5	31nH	75F328MPC Miller coil (Orange)
A3C8	22pF	Teflon foil Philips trimmer
A3C9		Not used
A3C10	270pF	Dipped Mica

WIRELESS INSTITUTE OF AUSTRALIA

REMEMBRANCE DAY CONTEST 1987

OPENING ADDRESS

by Dame Beryl Beaurepaire DBE

Chairman, Australian War Memorial, Canberra

Dame Beryl Beaurepaire, as Beryl Bedggood, had an early start in radio.

I was delighted to receive the invitation from your President, Mr David Wardlaw VK3ADW, to open the Wireless Institute of Australia Remembrance Day Contest.

I was particularly pleased because, as Chairman of the Australian War Memorial, I am aware of some direct help given to the Memorial by one of your members. When we started to repair our Lancaster bomber, G for George, our then Director, Air Vice-Marshal Flemming, found that much of the wireless equipment was missing. He and, of course, the Council were delighted when Maurie O'Keefe VK3KO, a former member of the Air Force, offered to help locate the necessary parts. In fact, Maurie himself served as a wireless operator in 460 Squadron based at Binbrook in England and is very knowledgeable in this field.

However, the focus of attention of this contest is to remember with respect those 26 amateur radio operators from throughout Australia who gave their lives in the service of their country during World War II, whilst being members of the armed services and serving in many zones of war.

This contest is conducted on the weekend nearest to August 15, being V-Day of the south-west Pacific Theatre of World War II. Therefore it is an appropriate way to remember those 26 brave men.

The great freedom which the Australian community enjoys today and the particular broad freedoms of amateur operators to pursue their chosen interests within the Amateur Radio Service of Australia are direct results of the demonstration of loyalty and effort of all those who, during wartime, have dedicated themselves to the service of their country and, in fact, in many cases are still serving their country in voluntary capacities.

This contest provides an excellent opportunity for amateur operators, whether they are members of the Institute or not, to come together in a spirit of friendly competition and to reflect upon their individual contribution to the community in which they live.

The Wireless Institute of Australia has, for the past three-quarters of a century, represented the interests of amateur operators in this country. The individualistic nature of your interests in amateur radio will mean that there will be many points of view to represent and the Institute has a difficult role in interpreting and representing those interests to Government and International authorities.

Your support and direct involvement in the affairs of the Wireless Institute of Australia will ensure a continuity and presence of the Amateur Radio Service in the future.

I note with interest that your counterparts in New Zealand are, for the first time, conducting their Memorial Day Contest during the same period as this Remembrance Day Contest, and I am sure there will be much friendly competition and co-operation between you over the next 24 hours.

I hope the co-operation between you and your New Zealand counterparts will continue in the future, not only in this Remembrance Day Contest. Amateur Radio Operators have a great deal to offer our community. After all, we are not always able to afford expensive satellite and computer type communication networks.

Thank you for giving me this opportunity to pay a tribute to the operators who died, and also to all Amateur Radio Operators.

Dame Beryl Edith Beaurepaire

Dame Beryl was born in Melbourne and educated at Fintona Girls School, later continuing her education at the University of Melbourne. She joined the Womens Australian Auxiliary Air Force (WAAAF) later to become the Womens Australia Air Force (WAAF), and known today as the Womens Royal Australian Air Force (WRAAF).

Dame Beryl on graduation, was one of the first eight WAAAF's to be appointed as a Meteorological Officer in 1945.

She has served the community by being a member on numerous voluntary service committees, acting in the capacity as a member, chairwoman, vice-president, president, and even to being the President of her old school's Board of Management.

This lady's community work was recognised when she received the Order of the British Empire in 1975 and further recognition came when she was created a Dame of the British Empire in 1981.

Dame Beryl Edith Beaurepaire, DBE, a very fitting choice, because of her present position as Chairman of the Australian War Memorial and is the first lady to deliver an opening address for a Remembrance Day Contest. She joins the ranks of Governors, Prime Ministers and other notable personalities in this role.

BUILDING BLOCKS REVISITED
Part 5

This article describes two modules. Module One is the board containing RF amplification, signal filtering and mixing processes, whilst Module Seven comprises a board that contains a fixed frequency crystal oscillator, mixer, filters and an amplifier.

Module One can be used for both receiving and transmitting, whilst Module Seven is used to heterodyne the 2.9-3.4 MHz VFO (described in Part 4) up to the injection frequency required for any specific amateur band.

It must again be emphasised that although these two modules are described in the context of an amateur transceiver, they have 'stand alone' uses wherever it is necessary to provide RF amplification, signal frequency filtering or frequency translation in the HF range.

MODULE ONE — RF AMPLIFIER

Figure 23 gives the circuit diagram of the module whilst Figure 24 shows the layout of components on the 6 x 1.5 inch (153 x 38 mm) single sided circuit board.

The device chosen for the RF amplifier is a 2N5109 bipolar transistor. This device was developed for use in CATV applications. It has unity gain/bandwidth of over 1.2 GHz and excellent intermodulation characteristics.

The transistor is used in a broadband configuration and is both preceded and followed by two pole, doubly terminated, bandpass filters to establish the required operating frequencies.

The coil and capacitor values for the various amateur bands are given in Table 1. The design of these filters is based on the method detailed by Hayward and De Maw on page 239 of the ARRL publication *Solid State Design for the Radio*, a book which is obtainable through your Division. Anyone having a requirement for frequency 'slices' other than those set out in Table 1 are referred to that publication. Since this project required the writer to do many of the multi-step calculations, a simple program for a Commodore C64 was developed, to ease the burden. A copy of this program is included with this article for the C64, and should be easily transposed into other BASIC language dialects.

As shown, the amplifier has a gain of 10 to 11 dB and has a -3 dB bandwidth of 1 to 35 MHz. Each of the two bandpass filter sections have a 2 dB insertion loss so that the overall gain of the stage is between 6 and 7 dB. Input and output impedances of both filter sections and of the amplifier are 50 ohms.

The mixer uses the Mini-Circuits SBL1, the same as that used for the product detector of Module Four, described in Part 2 of this series. As indicated, when discussing the product detector DBMs of this type require to 'see' 50 ohms at all three ports if their good intermodulation characteristics are to be realised. An oscillator injection of +7 dBm (5 mW/50 ohms) is also required at pin 8. Provided these requirements are met, the SBL1, will operate at all frequencies up to 500 MHz.

The mixer insertion loss is in the order of 6 to 7 dB, so that the overall gain of the board from the antenna input to IF output is 0 dB, a gain of 1.

This 'no gain' situation is quite deliberate and is in keeping with the current design philosophy of minimising gain until after the IF filter. Since the major contributors to intermodulation are usually the RF and mixer stages, preceding the IF filter, the need to minimise pre-filter gain is obvious.

The RF amplifier is a 'strong' one and operates in Class A, with a collector current of 65 mA. Besides being able to handle received signals of up to S9 + 40 dB (50 mV into 50 ohms) without any discomfort, the stage is also capable of handling transmit levels of up to 10 mW output and still keep intermodulation products below -35 dBm.

Thus, in addition to its receiving function, the unit can be used as a transmit mixer and transmit signal preamplifier. The necessary input and output changeovers are made with miniature relays.

Construction is straightforward and needs only care in parts placement and soldering. The relays are only needed if transceiver operation is contemplated. If they are not used, then the wire links across the appropriate places will be needed to maintain circuit continuity.

The coils L31, 32, 33 and 34 are identical and should be wound as tightly as possible onto the specified core, so that the turns are evenly spaced over 90 percent of the space available.

The capacitors C31 to C36 should be dipped mica types, although ceramic discs could be used if the unit is used for receiving purposes only.

The method of winding the bifilar transformer T31 (and the bifilar and trifilar transformers T2 and T3 of Module Seven) is shown in Figure 25.

When 12 volts is applied and with the two relays inoperative or not installed, the current drain should be around 65 mA.

Tuning the bandpass filters does really require a signal generator at this stage. If one is not available, then the trimmer capacitors should be set at about half capacity and peaked with an 'on air' signal, when all the boards are assembled into a finished receiver.

Whether this alignment signal comes off air or from a generator it should be in the middle of the band of interest and all four trimmers adjusted for maximum output.

MODULE SEVEN — THE INJECTION MIXER

The function of this module is to translate the 2.9 to 3.4 MHz VFO frequency to that for any required (for any specific amateur band) by the receive/transmit mixer of Module One.

The circuit diagram is given in Figure 21, while the layout of the components on the 6 x 1.5 inch (153 x 38 mm) PCB is shown in Figure 22.

Before examining the circuit in detail it is necessary to set out the frequency plan both in general terms and for specific amateur bands.

The frequency of the injection to the receive/transmit mixers is always higher than the signal frequency by the frequency of the chosen IF.

$$\text{ie } F(inj) = F(sig) + F(IF) \text{ MHz}$$

Since the IF used herein is 8 MHz this simplifies to:

$$F(inj) = F(sig) + 8 \text{ MHz}$$

This injection frequency is obtained by premixing the 2.9 - 3.4 MHz VFO with the output of a crystal oscillator is:

$$F(xo) = F(inj0 - 2.9 \text{ MHz}$$

The detail for each amateur band is given in Table 2.

The module contains four basic functions

1 A crystal oscillator.
2 An active mixer with broadband output.
3 A bandpass filter.
4 A broadband amplifier.

The crystal oscillator is designed round a BF981 dual gate FET and is so configured that its output can be either on the crystal frequency or at twice the crystal frequency. The mode of operation is determined by the constants of the tuned circuits L9/C19 and L10/C20 and 21.

This approach has been adopted so that the crystal used can remain below the practical manufacturing limit of 25 MHz for fundamental mode units.

Table 2 gives the mode of operation of the crystal oscillator for each amateur band, while Table 3 gives the coil and capacitor data.

Output is taken from the junction of C20 and C21, which point has an impedance, approximating to 500 ohms.

The mixer used in this application is a MC1496 active doubly balanced device. Whilst another SBL1 passive mixer could have been used on the grounds of uniformity, the MC1496 requires less drive and is somewhat more flexible from a design point of view. In this premixing application its inferior intermodulation performance is not as important.

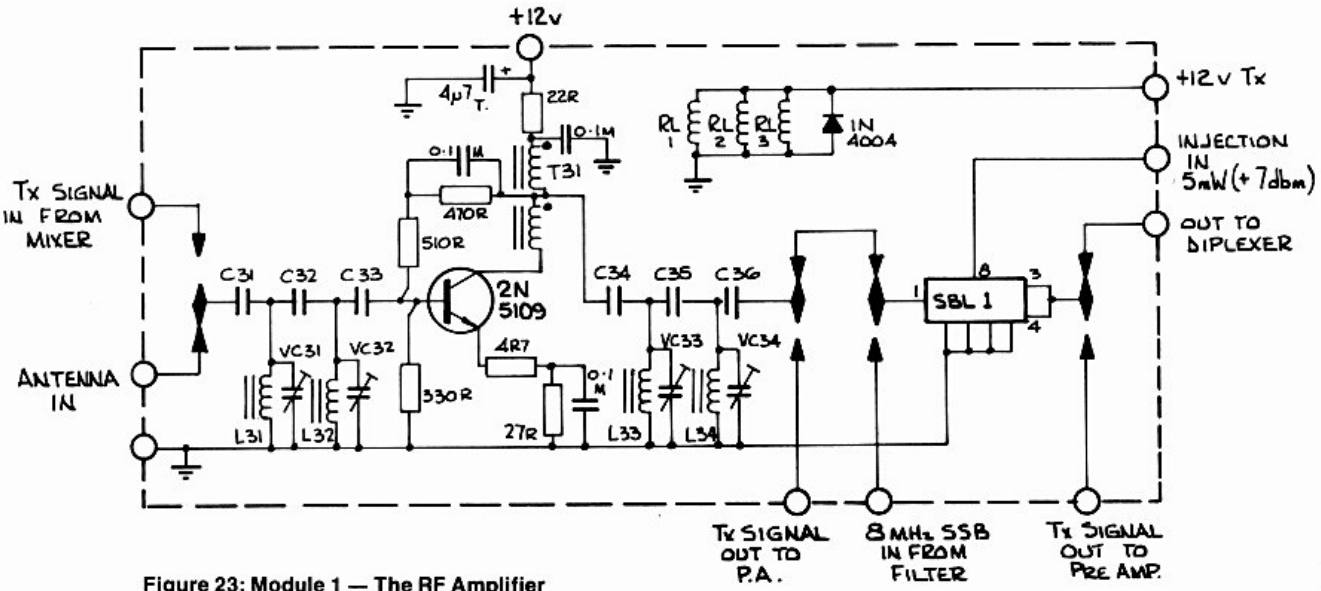
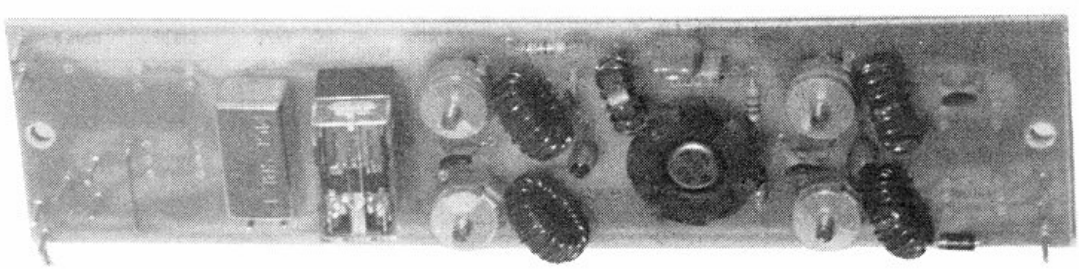


Figure 23: Module 1 — The RF Amplifier Circuit Diagram.

T31 — 10 bifilar turns of 26G Enamelled Wire wound on an Amidon T50/43 Ferrite Ring.

For details of VC31 to VC34, C31 to C36 and L31 to L34 — Refer to Table 4.



Module 1 — The photograph shows only one of the three relays installed on the board.

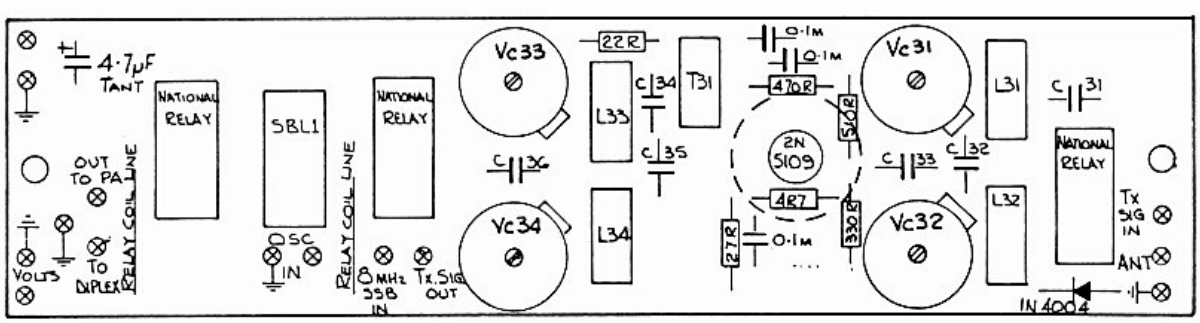


Figure 24: Module One — Layout of Components.

However, provision has been made to improve its intermodulation performance by increasing the current drawn by the device to the maximum allowed by the makers. To do this, the value of the current setting resistor attached to pin 5 has been reduced from the more conventional value of 10k to 3k3.

The crystal oscillator input is to pin 1, while the output of the VFO is injected into pin 8. In both cases series resistors allow the two input levels to be adjusted to 100 mV RMS and 300 mV RMS respectively, these figures representing the optimum injection levels.

Output from the MC1496 is via T2, a trifilar wound broadband transformer. The output from T2 is at an impedance of approximately 200 ohms and is constrained to the desired 500 kHz of operation by a two section bandpass filter. This filter is designed on exactly the same basis as those used in the RF amplifier of Module One, save that the frequency of operation and the input impedances are different. The same C64 program was used to calculate the filter coil and capacitor values for each amateur band given in Table 4.

The (filtered) injection output is around the -10 dBm (0.1 mW) level and is amplified to around +10 dBm (10 mW) by the 2N5179 broadband stage. This output is reduced to the +7 dBm (5 mW) level required by the receive/transmit mixer of Module One, by using a 3 dB resistive pad.

The 3 dB pad has to be there to ensure the 50 ohm impedance that the receive/transmit mixer wants to see, so that it is necessary to generate more power in the 2N5179 stage than is needed. The pad is the dog, not its tail.

CONSTRUCTION

Construction is again simply a matter of putting the components in the right places. The technique for winding L9 and L10 was detailed in Part 3. The only difference in this case is that the formers are first glued to a double (eight pin) coil base rather than two single bases.

The method of winding T2 and T3 is shown in Figure 25.

If the VFO is already up and going, the complete unit can be aligned in the following manner. With the diode probe (Refer Part 2) on the drain of the BF981, adjust the slug of L9. At some stage, the probe meter will register output. Most likely, as the slug is tuned through its travel, there will be a range of slug positions where output is indicated. Set the slug at the centre of this range.

Transfer the probe to the junction of C20 and C21. Adjust the slug of L10 for maximum reading. With the probe still at the junction of C20 and C21, readjust the slug of L9, to ensure its still in the centre of its range.

Set the 50k trimpot between pins 1 and 4 of the MC1496, at one end of its range. Connect in the VFO and set the output to 3.150 MHz. With the diode probe across the output, adjust C25 and C26 for maximum output.

Temporarily disable the crystal oscillator by earthing the 'live' pin of the crystal. Transfer the probe to the secondary of T2. There should be a detectable reading due to the mixer being (deliberately) unbalanced. Adjust the 50k potentiometer through its complete range. At some stage the probe meter reading should drop to zero and then at some later stage, rise again. Set the potentiometer, half way between these two points.

Remove the short across the crystal, transfer the probe to the output pins, and 'retweak' the slug of L10 (NOT L9), C25 and C26 for maximum output. This completes the preliminary commissioning procedure.

In the next issue of the series, the Power Amplifier and associated filters will described.

ar

Table 1: Band Pass Filter Constants — RF Stage.

BAND	3 dB POINTS MHz	COIL INDUCT µH	AMIDON CORE TYPE	No TURNS	B&S WIRE GAUGE	COIL UN-LOADED Q	C31/C34 pF	C32/C35 pF	C33/C36 pF	APPROX SET VC31 VC-34 pF	VC31/VC34 MAX CAPAC pF	
160	1.8 - 2.3	9.0	T68/2	40	26	225	470	120	470	100	130	
80	3.5 - 4.0	6.0	T68/2	32	26	225	150	33	150	120	130	
40	7.0 - 7.5	2.5	T68/6	23	24	210	62	10	62	120	130	
30	10.0 - 10.5	1.9	T68/6	20	24	210	39	4.7	35	90	130	
20	14.0 - 14.5	1.9	T68/6	20	24	210	18	2.2	18	45	70	
17	18.0 - 18.5	1.0	T50/6	16	24	200	15	2.2	15	60	70	
15	21.0 - 21.5	1.0	T50/6	16	24	200	10	1.2	10	45	70	
12	24.5 - 25.0	0.5	T50/6	11	24	200	10	1.5	10	70	130	
10	28.0 - 29.5	0.5	T50/6	11	24	200	15	2.7	15	45	70	

Notes:
1 Trimmers VC31 and VC34 are Philips Type 2222-808. 130 pF — Green-body. 70 pF — Yellow-body.
2 Nearest Metric size of wire can be substituted for B & S Gauge.

Table 2: Frequency Plan.

BAND	SIGNAL FREQUENCY MHz	IF MHz	INJECTION FREQUENCY MHz	VFO RANGE MHz	CRYSTAL FREQUENCY MHz	CRYSTAL OSCILLATOR MODE	CRYSTAL OSCILLATOR OUTPUT MHz
160	1.8 - 2.3	8.0	9.8 - 10.3	2.9 - 3.4	6.90	Fund	6.90
80	3.5 - 4.0	8.0	11.5 - 12.0	2.9 - 3.4	8.60	Fund	8.60
40	7.0 - 7.5	8.0	15.0 - 15.5	2.9 - 3.4	12.10	Fund	12.10
30	10.0 - 10.5	8.0	18.0 - 18.5	2.9 - 3.4	15.10	Fund	15.10
20	14.0 - 14.5	8.0	22.0 - 22.5	2.9 - 3.4	19.10	Fund	19.10
17	18.0 - 18.5	8.0	26.0 - 26.5	2.9 - 3.4	11.55	D'bler	23.10
15	21.0 - 21.5	8.0	29.0 - 29.5	2.9 - 3.4	13.05	D'bler	26.10
12	24.5 - 25.0	8.0	32.5 - 33.0	2.9 - 3.4	14.80	D'bler	29.60
10A	28.0 - 28.5	8.0	36.0 - 36.5	2.9 - 3.4	16.55	D'bler	33.10
10B	28.5 - 29.0	8.0	36.5 - 37.0	2.9 - 3.4	16.80	D'bler	33.60
10C	29.0 - 29.5	8.0	37.0 - 37.5	2.9 - 3.4	17.05	D'bler	34.10
10D	29.5 - 30.0	8.0	37.5 - 38.0	2.9 - 3.4	17.30	D'bler	34.60

Table 3: Crystal Oscillator Coil and Capacitor Data.

	L9/L10							
BAND	CRYSTAL OSC OUTPUT MHz	No TURNS	B&S WIRE GAUGE	METRIC WIRE GAUGE	TYPE	C19 pF	C20 pF	C21 pF
160	6.9	35	32	0.25	Enam	150	180	820
80	8.6	35	32	0.25	Enam	82	120	680
40	12.1	28	32	0.25	Enam	68	82	390
30	15.1	28	32	0.25	Enam	39	47	220
20	19.1	25	32	0.25	Enam	18	22	100
17	23.1	18	26	0.50	Enam	47	56	220
15	26.1	18	26	0.50	Enam	39	47	220
12	29.6	15	26	0.50	Enam	33	39	180
10	33.1 - 34.6	15	26	0.50	Enam	33	39	180

Note:
1 All coils close wound on Neosid 5 mm Forms — Type 722/1.
2 Formers glued to eight-pin double base plate.
3 Tuning slugs all F29.

Table 4: Coil and Capacitor Data for Injection Mixer Bandpass Filters.

	L11/L12								
BAND	3 dB BANDWIDTH MHz	COIL INDUCT µH	No TURNS	ENAM WIRE SIZE B&S	C22 pF	C23 pF	C24 pF	APPROX SETTING C25 pF	APPROX SETTING C26 pF
160	9.8 - 10.3	2.0	22	26	18	4.7	36	100	82
80	11.5 - 12.0	2.0	22	26	15	3.3	27	75	62
40	15.0 - 15.5	0.8	14	24	12	3.3	22	120	110
30	18.0 - 18.5	0.8	14	24	8.2	2.2	18	85	75
20	22.0 - 22.5	0.4	10	24	8.2	2.2	15	117	113
17	26.0 - 26.5	0.4	10	24	5.6	1.5	10	85	80
15	29.0 - 29.5	0.4	10	24	6.8	1.8	15	65	60
12	32.5 - 33.0	0.2	7	24	4.7	1.5	8.2	112	107
10	36.0 - 38.0	0.2	7	24	10	3.9	18	82	72

NOTES:
1 All coils wound on Amidon T50/6 Powdered Iron Toroids
2 C25/C26 in all cases, Philips 2222-808 type trimmers. 130 pF Cmax Greenbody
3 Coil unloaded Q taken as 200 in all cases
4 Filter input impedance = 200 ohms
5 Filter output impedance = 50 ohms

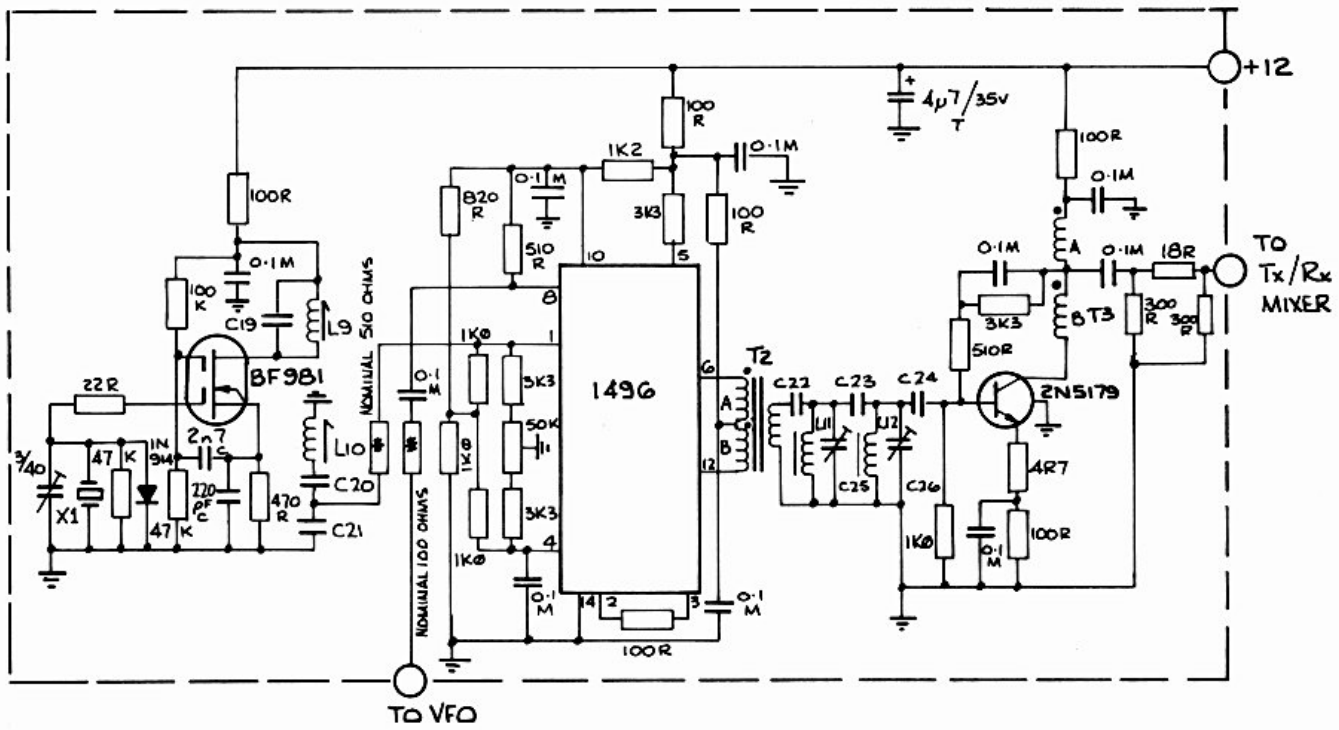
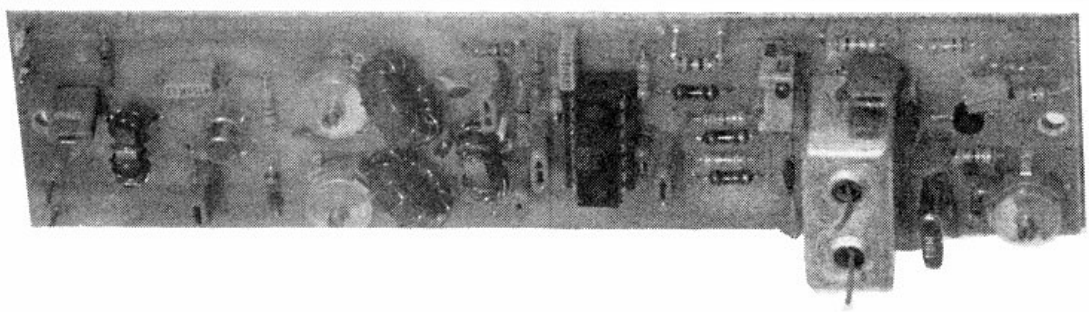


Figure 21: Module 7 — The Injection Mixer Circuit Diagram.

Notes:

1 M = Monolithic Ceramic Capacitor
2 C = Ceramic Disc Capacitor
3 * = Refer Text
4 L9, 10, 11, 12 and associated C — Refer Tables 2 and 3
5 All resistors 0.25 Watt five-percent tolerance
6 T2 = 10 Trifilar turns 26 Gauge on an Amidon 50/43 Toroid
7 T3 = 10 Bifilar turns 26 Gauge on Amidon T50/43 Toroid



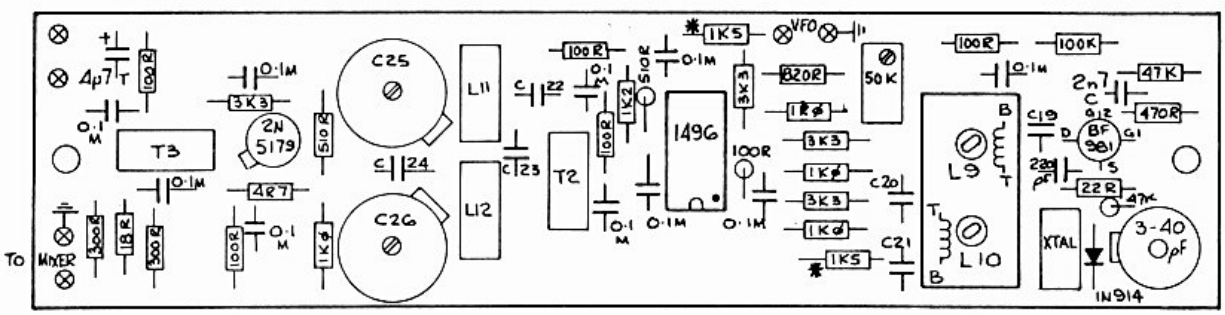


Figure 22: Module Seven — Layout of Components.

```
+ 3DB FREQUENCY - MHZ -          14.4
- 3DB FREQUENCY - MHZ -          14
INDUCTOR - MICROHENRIES -        2.08
INDUCTOR UNLOADED Q -            225
INPUT IMPEDENCE - OHMS -         50
OUTPUT IMPEDENCE - OHMS -        50
INPUT COUPLING CAP - PF -        14.5
CENTER COUPLING CAP - PF -       1.2
OUTPUT COUPLING CAP - PF -       14.5
INPUT TUNING CAP - PF -          44.7
OUTPUT TUNING CAP - PF -         44.7
```

Table 5: Example of Program Output.

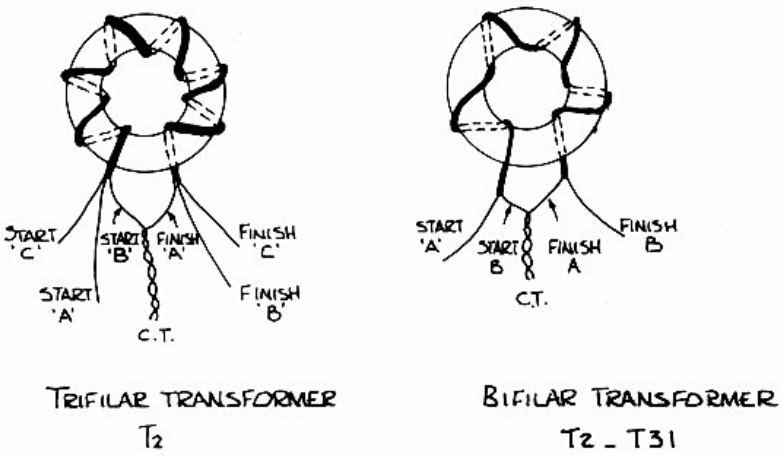


Figure 25: Detail of Transformer.
Trifilar Transformer T2
Bifilar Transformer T2 and T31
Notes:
1 Two or three strands of specified wire twisted together — approximately three turns per centimetre.
2 Identify individual windings with 2-3 mm lengths of coloured PVC stripped from hook-up wire.

```
10 REM"2 POLE BANDPASS FILTERS"
20 POKE 53280,4:POKE 53281,0
30 PRINT CHR$(5)
40 PRINT CHR$(147)
50 PRINT"CALCULATION OF CONSTANTS FOR"
60 PRINT"DOUBLY TERMINATED DOUBLE"
70 PRINT"TUNED BANDPASS FILTERS"
80 PRINT"USING METHOD OF W7ZOI AND W1FB"
85 PRINT"IN SOLID STATE DESIGN FOR THE"
90 PRINT"RADIO AMATEUR PAGE 237 ET SEQ"
100 PRINT
110 PRINT"BY H.L.HEPBURN VK3AFQ"
115 PRINT
120 INPUT"UPPER 3DB POINT-MHZ";F1
130 INPUT"LOWER 3DB POINT-MHZ";F2
140 INPUT"INDUCTOR SIZE-MICROHENRIES";L1
150 INPUT"INDUCTOR UNLOADED Q";Q1
160 INPUT"FILTER INPUT IMPEDENCE-OHMS";Z1
170 INPUT"FILTER OUTPUT IMPEDENCE-OHMS";Z2
180 REM-CALCULATE MEAN FREQUENCY F3
190 F3=SQR(F1*F2)
200 REM CALCULATE 3DB BANDWIDTH F4
210 F4=F1-F2
220 REM CALCULATE ANGULAR FREQUENCY W1
225 PI=3.14159
230 W1=2*PI*F3
240 REM CALC TOTAL TUNING CAPACITY-C1
250 C1=10↑6/(L1*W1*W1)
260 REM CALCULATE LOADED Q- Q2
270 Q2=W1/(2*PI*F4)
280 REM CALCULATE Q3
290 Q3=1.414*Q2
300 REM CALC CENTER COUPLING CAPACITOR-C3
310 C3=C1/Q3
315 C3=C3*100:C3=INT(C3):C3=C3/100
320 REM CALCULATE Q4
330 Q4=1/(1/Q3-1/Q1)
340 REM CALCULATE INPUT RESISTANCE-R1
350 R1=Q4*W1*L1
360 REM CALCULATE OUTPUT RESISTANCE-R2
370 R2=Q4*W1*L1
380 REM CALCULATE INPUT COUPLING CAPACITOR-C2
390 C2=10↑6/(W1*(SQR((R1*Z1)-(Z1↑2))))
395 C2=C2*100:C2=INT(C2):C2=C2/100
400 REM CALCULATE OUTPUT COUPLING CAPACITOR-C4
410 C4=10↑6/(W1*(SQR((R2*Z2)-(Z2↑2))))
415 C4=C4*100:C4=INT(C4):C4=C4/100
420 REM CALCULATE INPUT TUNING CAPACITY-C5
430 C5=C1-C2-C3
435 C5=C5*100:C5=INT(C5):C5=C5/100
440 REM CALCULATE OUTPUT TUNING CAPACITY-C6
450 C6=C1-C3-C4
455 C6=C6*100:C6=INT(C6):C6=C6/100
460 PRINT"INPUT COUPLING CAPACITOR=PF";C2
465 PRINT
470 PRINT"CENTER COUPLING CAPACITOR=PF";C3
475 PRINT
480 PRINT"OUTPUT COUPLING CAPACITOR=PF";C4
485 PRINT
490 PRINT"INPUT TUNING CAPACITOR=PF";C5
495 PRINT
500 PRINT"OUTPUT TUNING CAPACITOR=PF";C6
510 PRINT"PRESS P FOR HARD COPY"
520 INPUTA$
525 IF A$="P" THEN GOTO 540 ELSE END
540 OPEN3,4
550 PRINT#3,"+ 3DB FREQUENCY - MHZ -        "F1
560 PRINT#3,"- 3DB FREQUENCY - MHZ -        "F2
570 PRINT#3,"INDUCTOR - MICROHENRIES -      "L1
580 PRINT#3,"INDUCTOR UNLOADED Q. -         "Q1
590 PRINT#3,"INPUT IMPEDENCE - OHMS -       "Z1
600 PRINT#3,"OUTPUT IMPEDENCE - OHMS -      "Z2
650 PRINT#3,"INPUT COUPLING CAP - PF -      "C2
660 PRINT#3,"CENTER COUPLING CAP - PF -     "C3
670 PRINT#3,"OUTPUT COUPLING CAP - PF -     "C4
680 PRINT#3,"INPUT TUNING CAP - PF -        "C5
690 PRINT#3,"OUTPUT TUNING CAP - PF -       "C6
700 CLOSE3
710 END
```

Appendix 1: C64 Program for Calculation of Two-Pole Doubly Terminated Bandpass Filters.

Spectrum Analyser Waveforms

Lloyd Butler VK5BR
18 Ottawa Avenue, Panorama, SA. 5041

Over the years, the cathode ray oscilloscope (CRO) has been a universal instrument for examining analogue signals.

RAPID ADVANCES IN technology have led to a new era of microcomputer controlled, digitally processed, test equipment, not the least of which is the modern spectrum analyser which enables greater precision analysis of analogue signals than is possible with the CRO.

A spectrum analyser plots signal amplitude (or signal power) as a function of frequency compared to the CRO which plots signal amplitude as a function of time.

The spectrum analyser is not the type of equipment normally within the reach of the radio amateur and because of this, it was thought that it would be of interest to illustrate a few spectrum plots of well-known waveforms.

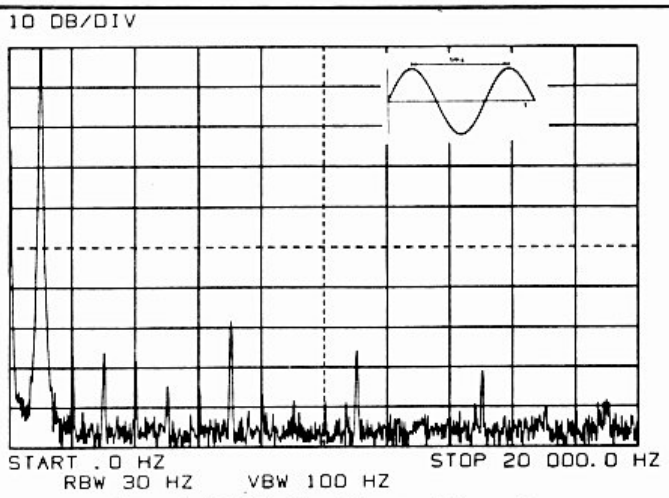


Figure 1: 1000 Hz Sine Wave and Harmonics.

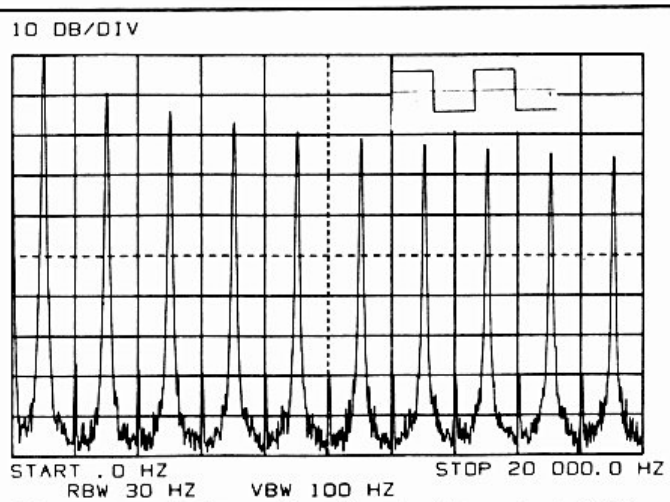


Figure 2: 1000 Hz Square Wave Showing Harmonics to 20 kHz.

BASIC WAVEFORMS

Figure 1 shows the spectrum of a sine wave oscillator with fundamental at 1000 Hz and harmonics up to 20 kHz. The highest level harmonic at 7 kHz is 70 dB below the fundamental, representing a harmonic distortion of 0.03 percent. This is a very good oscillator which would not be matched by many laboratory instruments. It can also be seen that the noise floor is about 95 dB below the fundamental and this is also very good. The oscillator noise level might be even better than this as much of the noise is due to the spectrum analyser itself.

Figure 2 shows a 1000 Hz square wave. A perfect square wave generates odd harmonics to infinity with an amplitude 1/n relative to that of the fundamental or (20 log n) dB below the fundamental. ('n' is the order of harmonic). For n = 3, 5, 7 and 9 this calculates to -9.5, -14, -16.9 and -19.1 dB respectively, very close to the readings shown in Figure 2.

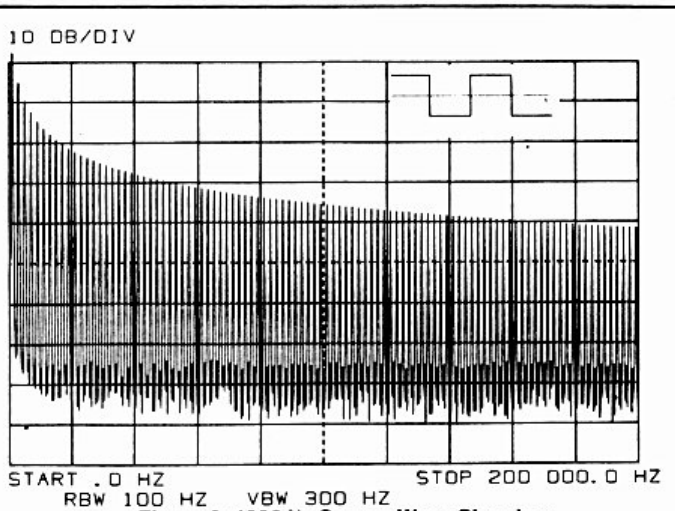


Figure 3: 1000 Hz Square Wave Showing Harmonics to 200 kHz.

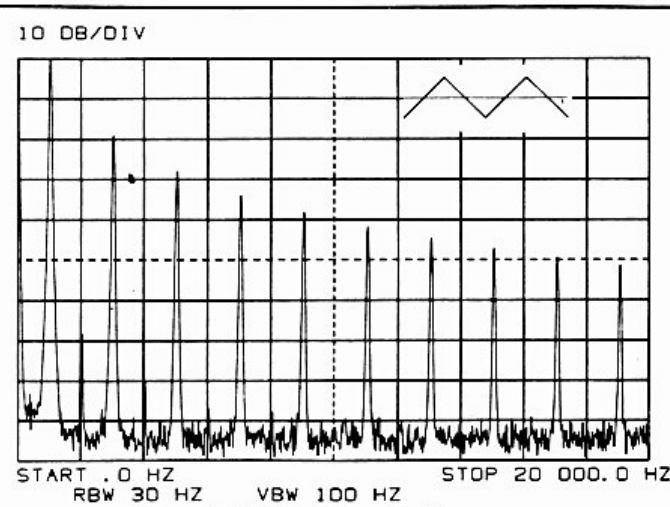


Figure 4: 1000 Hz Triangular Wave.

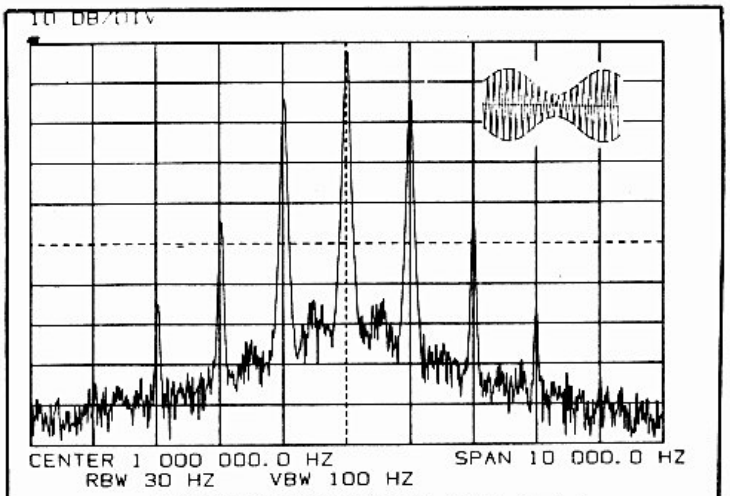


Figure 4: 50 percent Amplitude Modulated Signal — Modulating Frequency 1000 Hz.

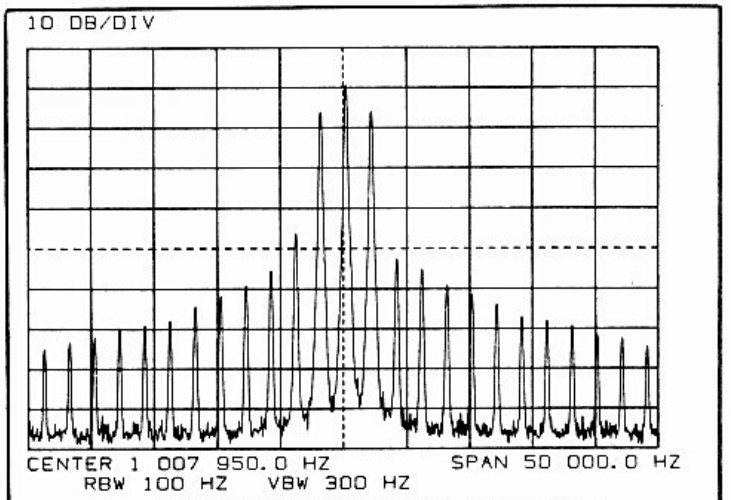


Figure 6: 100 percent Amplitude Modulated Signal — Modulating frequency 1000 Hz.

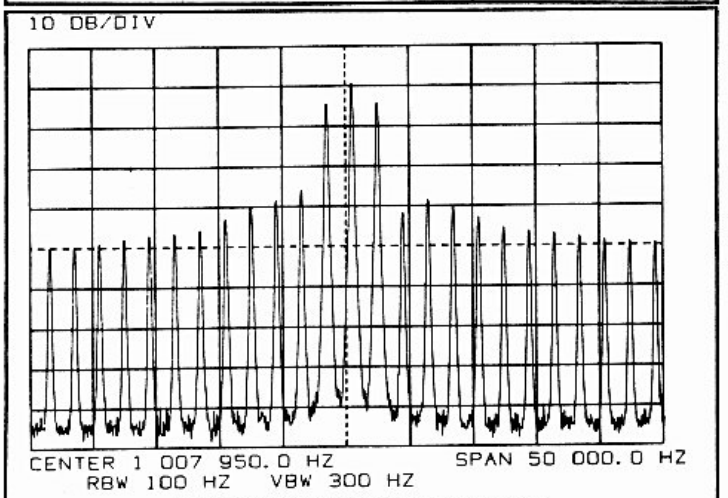


Figure 7: Over modulated AM Signal — Modulating Frequency 1000 Hz.

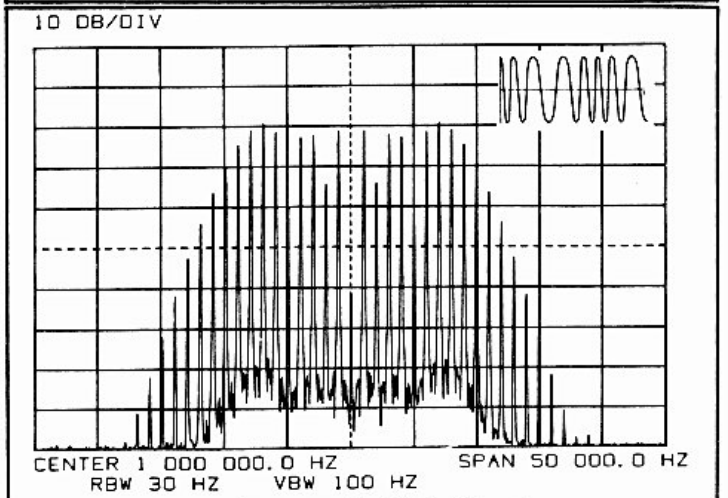


Figure 8: Frequency Modulated Signal — Modulating Frequency 1000 Hz, Modulation Index 8.650 and Showing Third Carrier Null.

Figure 3 is the same square wave plotted out to 200 kHz and showing the apparently unlimited spread of harmonics. From this, it is easy to see why a low frequency square wave oscillator can be used as a marker generator over a wide frequency range.

Figure 4 shows a 1000 Hz triangular wave. A perfect triangular wave also generates odd harmonics to infinity, but each amplitude is (1/n) squared relative to the fundamental or (40 log n) dB below the fundamental. For n = 3, 5, 7 and 9, the calculation is -19, -28, -33.8 and -38.2 dB respectively, again very close to the readings shown.

MODULATION

Figure 5 shows a 1 MHz carrier frequency, amplitude modulated by a frequency of 1 kHz to a modulation depth of 50 percent. For this case, the two side frequencies, 1 kHz either side of the carrier, are 12 dB below the carrier level, or a quarter of its amplitude. Other side frequencies at 2 kHz and 3 kHz, either side of the carrier, are the result of harmonics either in the original modulating tone or distortion caused by the modulation process. The 2 kHz side frequencies are about 30 dB below the 1 kHz side frequencies representing about three percent distortion in the system.

In Figure 6, the modulation level has been increased to 100 percent and the side frequencies 1 kHz either side of the carrier, are now 6 dB below carrier level, or half its amplitude. The spectrum has been expanded to show many more harmonically related sideband components which now appear. Except for those close to the carrier, most of the components are more than 50 dB down and not of any great concern.

In Figure 7, the carrier is over-modulated and there is now a spread of sideband components about 30 dB down. If this were an amateur radio transmitter, other amateur stations in nearby suburbs would be complaining about sideband splatter.

Figure 8 shows a 1 MHz carrier, frequency modulated by a 1 kHz tone with a deviation of 8.650 kHz, representing a modulation index of 8.650. It can be seen that there are many side frequencies all spaced by an amount equal to the modulating frequency (1 kHz). For this signal, a significant bandwidth of about 20 to 30 kHz is being utilised.

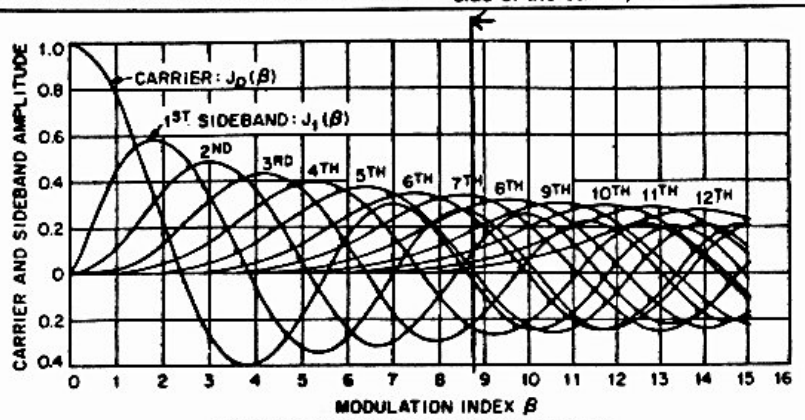


Figure 9: Plot of Bessel Functions (third carrier null at modulation index = 8.650 is shown).

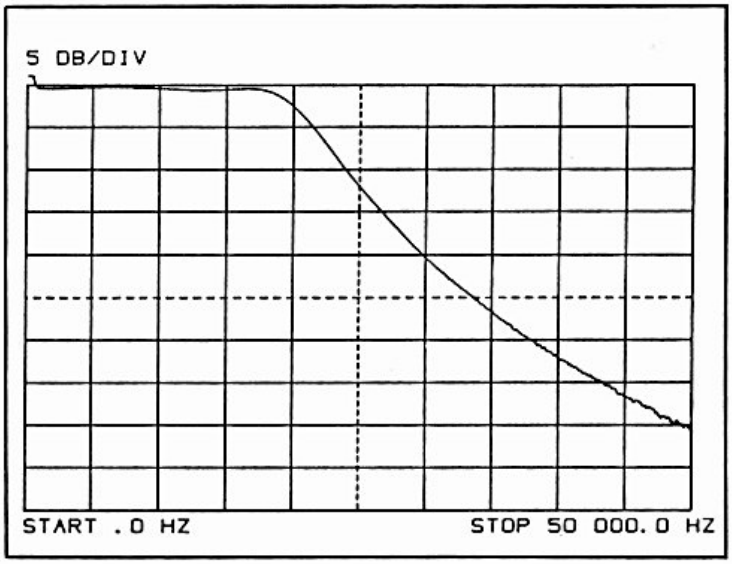


Figure 10: Low Pass Filter Response (fco = 20 kHz).

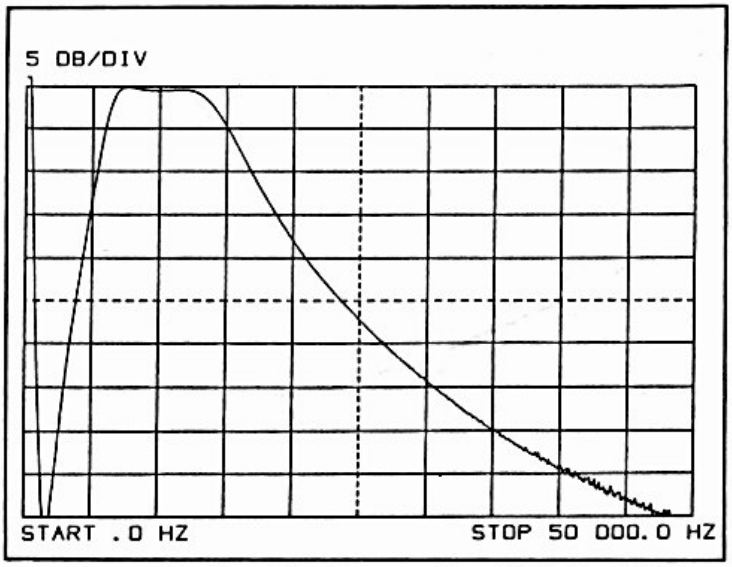


Figure 11: Bandpass Filter Response (fc = 10 kHz, B = 8 kHz).

If we now examine Figure 9, which plots the amplitude of the carrier and side frequencies against the value of modulation index, we can see that there are a number of values of modulation index where the carrier level becomes zero. These are very convenient references to calibrate the amount of deviation. In Figure 8, the deviation has been set to produce the third carrier null at a modulation index of 8.650, so we know precisely that with our modulating frequency of 1000 Hz, our deviation is 8.650 x 1000 = 8650 Hz.

FREQUENCY RESPONSE

Another useful function of the spectrum analyser is to plot the frequency response of a four terminal device such as an amplifier or a filter. In this case, the analyser frequency sweep generator is fed to the input of the device and the output of the device is fed to the input of the analyser. Typical plots of a low pass filter and a bandpass filter are shown in Figures 10 and 11 respectively.

Your Division has a full range of products for the radio amateur. Items, at an attractive price for members, include technical books, call books, log books, and wearing apparel.

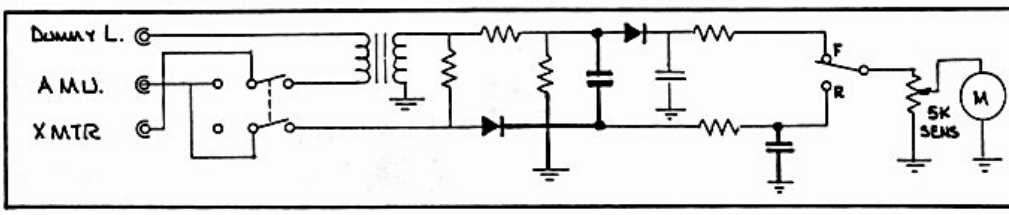
WIA LOG BOOKS LEISURE SHIRTS & T-SHIRTS, ideal for the approaching warmer weather, are now available in assorted sizes.

INQUIRE NOW AT YOUR DIVISIONAL OFFICE.

CORRECTION

Unfortunately, there was an error reproduced on the schematic diagram of the "Tune Up Protection Device" page 6 of May AR.

The corrected diagram is as follows.



NEWS FROM LONDON

Tony Smith G4FAI
1 Tash Place, New Southgate, London, N11 1PA

GREETINGS MESSAGES

The nearest thing to Third Party Traffic in the UK is a facility enabling greetings messages to be sent from GB special event stations. Under the control of the licensee, a non-licensed person may speak into the microphone to send a message to any other amateur station. Each person may pass only one message, which must not exceed two minutes.

This arrangement was introduced in October 1982, for contacts with G- stations only. In October 1985, just in time for JOTA, the facility was extended to contacts with stations in the USA, Canada and the Falklands, and it was understood that negotiations were then in hand for similar agreements with Australia and New Zealand. I have since been led to believe that Australia's DOC, in fact, agreed the proposal in May 1985, but I may have misunderstood the situation.

To clarify it, I recently asked the Department of Trade and Industry in London, who are responsible for such matters, what had happened to the proposed agreement with Australia. They replied, "The possibility of approaching the Australian administration to enter into such an agreement still exists. . .it is our fervent hope that we will be able to enter into such an agreement before this year's JOTA but we cannot be certain."

So, perhaps this years Scouts and Guides in the UK and Australia will be able to say a few words to each other through JOTA. It should be understood, though, this is not Third Party Traffic as it is understood in Australia as the messages are not intended for relaying to other destinations. JOTA is an obvious beneficiary, but it does introduce the possibility of greetings being exchanged person to person, by prior arrangement, on special occasions such as birthdays, Christmas, etc.

There seems little interest in the idea of Third Party Traffic in the UK, despite a certain amount of publicity about the Australian experience. The RSGB will not allow articles on the subject in *Radio Communication* in case they prejudice "current discussions" with the DTI. What is being discussed I have been unable to find out for sure, although I think it relates to packet radio. Whatever it is, I think it will be a very long time before there is even a suggestion that it might be possible to send "proper" Third Party Messages via amateur radio between Australia and the UK. But maybe I'm wrong!

RESUME OF BACKGROUND AND SCHEDULE FOR 50 AND 70 MHz BANDS

As from 2300 UTC, May 31, 1987, Class B licensees in the UK are able to operate on expanded 50 and 70 MHz. Amateurs also became the primary users on these bands.

Following are the new provisions in full:

- The 50 MHz band available to UK radio amateurs will become 50-52 MHz
- UK radio amateurs will have primary status from 50-51 MHz and secondary status between 51 and 52 MHz
- There is no restriction on the location of a 50 MHz station — ie /A and /P operation is now possible
- Mobile operation on 50 MHz is not permissible at present
- The 70 MHz band will be expanded to 70.000-70.500 MHz, with UK amateurs being granted secondary status
- Class B licensees will be permitted to operate on both bands

Some of the provisos are:

Antennas for 50 MHz must not be at a height greater than 20 metres above ground level, and must remain horizontally polarised to protect television broadcast transmitters which are still operational in Europe.

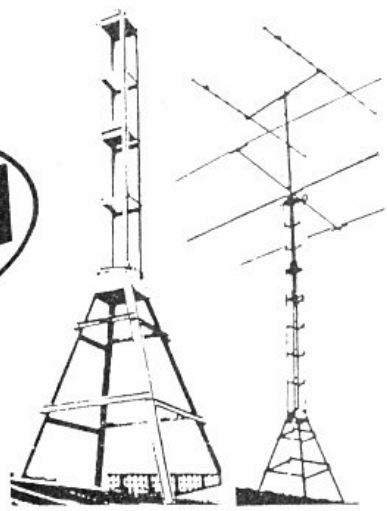
For the present, permitted power on 50 MHz remains at 14 dBW carrier and 20 dBW ERP, which was established last year when the band was released to Class A licensees. However, the DTI will review power levels for 50 MHz in six months.

Permitted modes on both 50 and 70 MHz are Morse, RTTY, telephony, data, SSTV, and facsimile.

ar

EMTRON'S MODULAR ANTENNA TOWERS

NEW

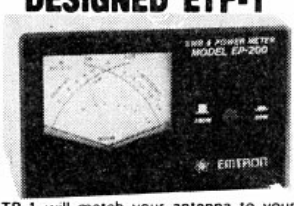


Ideal for ground or roof mounts.
Modular, portable, extremely rugged.
• One man assembly and installation • Lightweight
• High quality aluminium alloy • High stability

Finally here are strong, sturdy antenna towers that are simple to assemble, lightweight, strong and can be used on your rooftop or packed up and used in the field. Available in three modules: 3.8m (11½'), 5.5m (18') and 7.5 (25'). The 11½ foot model has base and one tower module; the 18 foot has two tower modules; and the 25 foot model contains three tower modules.

MODEL ET-1 Base plus 1 tower section, and hardware $497
MODEL ET-2 Tower section only $190

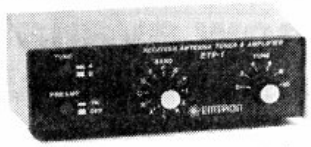
FOR SWL EMTRON DESIGNED ETP-1



ETP-1 will match your antenna to your receiver for maximum signal from MW to SW. It utilizes a low noise 12dB gain preamplifier to boost weak signals. Special spring loaded long wire terminals as well as SO239 connectors make ETP-1 the most versatile tuner/amplifier on the market.

ONLY $159 & $10 P&P

EMTRON'S PRECISION CROSS NEEDLE RF EP200 SWR METER



Yes this new from EMTRON — highly accurate CROSS-NEEDLE SWR & POWER meter, model EP-200 with a freq range from 1.8 MHz to 60 MHz and two power ranges 20, 200 watts, gives instantaneous readings of forward/reverse power and SWR

ONLY $99 + $10 POST

NEW from EMTRON

Professionally made noise bridge for all kinds of RF measurements antena adj etc.

NOISE BRIDGE with EXPANDER EBN-2 $129 & $10 P&P

EMTRON'S NEW HF SWR METER EP-1

Specially designed with PRICE, QUALITY AND ECONOMY IN MIND. Freq range from 3.50 MHz. Reads forward and reflected relative power. Ideally suited for amateur and CB services.

$49 & $5 P&P

NEW from EMTRON EAA230 active antenna a SWL delight

Specially designed for SWL. Based on the famous "DRESSLER DESIGN", the unique electronic circuitry gives to receiver a perfect impedance match from 100kHz to 30MHz. A 12 dB low noise pre-amplifier gives weak signals a boost comes complete with 240V AC 12V DL supply and 10M of coax.

$259 & $15 DEL.

CORRESPONDENCE: BOX K21, HAYMARKET, NSW. 2000

EMTRONICS

MAIL ORDERS WELCOME

In response to AR's review of our EAT300A Antenna Tuner in the June issue, please note the following:

EMTRONICS (DIV. OF EMONA ELECTRONICS PTY. LTD.)

CITY & SHOWROOM: 92-94 WENTWORTH AVENUE, SYDNEY, N.S.W. 2000 Ph. (02) 211 0988
POSTAL ADDRESS: P.O. BOX K21, HAYMARKET, N.S.W. 2000, AUSTRALIA
TELEX: AA73990 EMOLEC

Amateur Radio,
3/105 Hawthorn Road,
CAULFIELD NTH. VIC 3161

23rd June, 1987.

ATTENTION: Mr. Bill Rice- Editor

Dear Sir,

In reference to your "EQUIPMENT REVIEW" article on page 32 of June Amateur Radio - Emtron EAT-300A antenna tuner, I would like to make the following comments.

1. The EAT-300A is not an improved version of the EAT-300 since they are ELECTRICALLY IDENTICAL! Instead EAT-300A is a new unit with many more features and does not supersede the EAT-300.

2. It is customary to rate all antenna tuners in PEP values instead of average and the reviewer should have been aware of it. Believe me, there is a very good reason for this condition. Also power rating is valid only when the tuner is correctly adjusted. A simple mathematical excersize would prove, that at a power level of 300 watts and a dy a ic range of 5 to well over 2000 OHMS a voltage of less than 1000 V would be generated across the terminals. The variable capacitors in our 300 series tuners are rated at 1000 volts; consequently the 300 series tuners when correctly adjusted would easily handle their rated power and therefore any transceiver on the market today.

3. There are two reasons, why I have decided to use a 200 watt FSD power meter in this tuner.
   (a) Since the meter does not indicate PEP but average power, there is no reason for a 300 watt FSD meter.
   (b) The second reason is a practical one! Since all EMTRON CROSS-NEEDLE meters are custom made, and a minimum order of 1000 meters or more is accepted by the meter manufacturer, it would be rather difficult for us to order a different meter for each product manufactured by EMTRON. As you are probably aware, the same meter is used in EAT-300A, EAT-1000A, EAT-2000A, EP-200 and some other products still on the drawing board.

4. The built in dummy load in EAT-300A is rated 100 watts at 50% duty cycle (or 300 watts at 20% duty cycle). However, since all practical power measurements and tuning of older type transceivers is done well within a minute, I have therefore decided as a precaution to put a one minute limit, although this limit is very much under rated and has nothing to do with the power rating of the tuner. The dummy load is there as an additional and very useful feature and again I repeat has nothing to do with the tuner and its power rating. The reviewer has certainly mixed up everything.

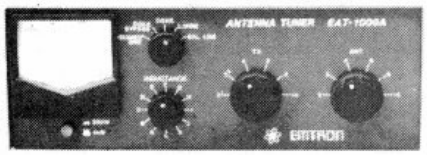
5. Re "AIR WOUND INDUCTOR" overheating; I don't know where and how Ron Fisher got his results from. Let me tell you that several tests have been conducted in our laboratory with continuous 200 watts on 80 metres for 30 minutes, the coil did warm up which is only natural but the temperature level where by touching it with a more sensitive part of a hand was not unpleasant at all. These tests have been performed on a balanced output with impedances ranging from 200 to 800 OHMS. Therefore I completely reject Ron Fisher's claim. For your information the 200 watts continuous power has been generated with a transceiver driving a TL 922 linear amplifier. I can only suggest that Ron Fisher has also slipped badly by suggesting that tuning with 125 watts caused capacitors to spark. He has done precisely what every tuner manual, no matter how poorly written, tries to prevent the user from doing. What he should have done is to adjust the tuner first at low power as suggested in the manual and then apply full power. Nobody in his right mind would do it otherwise.

6. Finally, Ron's criticism of the manual is fully justified. Too much has been taken for granted. These days when most amateurs are appliance operators, we at Emtron should have known better and produced a more detailed OPERATORS MANUAL, which is now in preparation.

Yours faithfully,

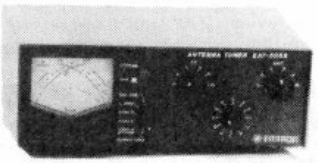
RUDI BREZNIK VK2AOI
Emtron Industries

NEW 1KW EMTRON TUNER
EAT-1000A Only $499



This new EAT-1000/A is EMTRON'S latest antenna tuner built on special request by many amateurs. Built with finest components available. 5 position internal antenna switch, cross needle SWR/power meter, built in 3:1 balun for open feedline and antenna terminals for coax line, open feedline as well as longwire. EAT-1000A will tune almost everything from 1.8 to 30 MHz. At lowest price professional design and quality that EMTRON provides. MADE IN AUST.

NEW 300W EMTRON TUNER
EAT-300A Only $349



The finest 300 watt antenna tuner on the market with quality that only EMTRON can provide! Unique features such as:
• Cross needle SW 12/forward & reverse power meter • Built-in 100 watt dummy load • Antenna switch including bypass • Built-in 1:4 balun for open feedline • Lowest price & professional design • Matches everything from 1.8-30 MHz • Made in Australia by Emtron

OVER 1000 FAMOUS EAT-300 SOLD

EMTRON'S fastest selling 300 watt antenna tuner with SWR meter, built-in 1:4 balun, heavy duty ceramic switch and top grade components. Works with all rigs and is found in Amateur, Commercial and Marine services.

Only $239

CORRESPONDENCE:
BOX K21,
HAYMARKET, NSW.
2000

EMTRONICS

MAIL ORDERS WELCOME

NSW & HEAD OFFICE:
92-94 Wentworth Ave, Sydney
NSW. 2000. TLX:AA73990
P.O. Box K21 Haymarket, NSW. 2000.
Ph: (02) 211 0988
FAX: (02) 281 1508

VICTORIA:
288-294 Queen St, Melbourne
Vic. 3000.
Entrance from Lt. Lonsdale St.
Ph: (03) 670 8551 or 670 0330
FAX: (03) 670 0671

QUEENSLAND:
416 Logan Road, Stones Corner
Qld. 4120. TLX:144696
Ph: (07) 394 2555
FAX: (07) 39 4316

Historic Aircraft Restored

Dave Jeanes VK2BSJ
11 Tanami Close, Belrose, NSW. 2085

THE AEROPLANE

The Boeing-built Catalina flying boat, 'Frigate Bird II' has recently been painstakingly restored at Bankstown Airport by Hawker Pacific Aviation, funded by a Federal grant.

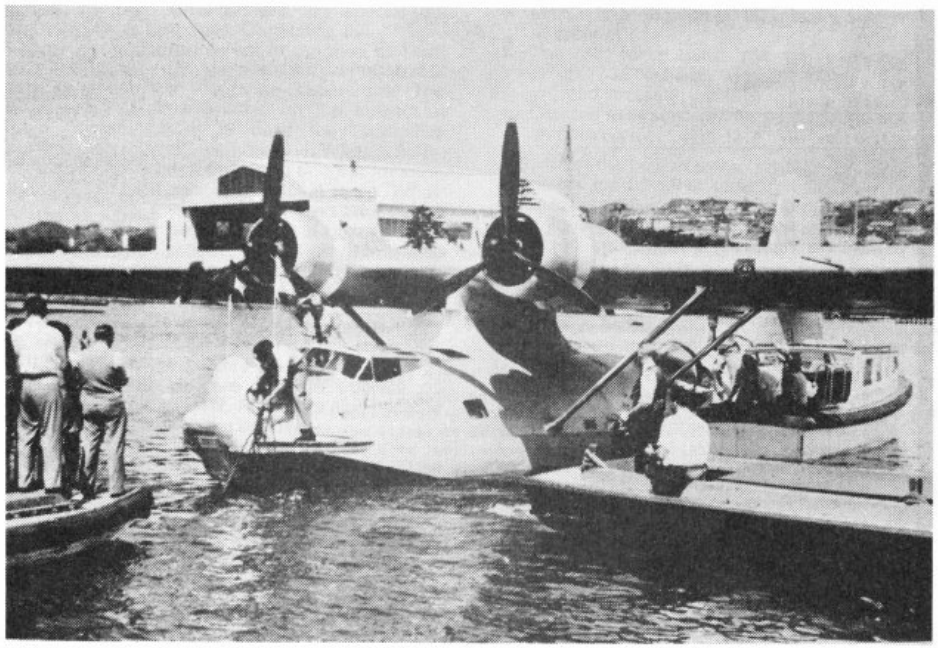
In 1951, this aeroplane made Australia's last great historic flight, from Rose Bay in Sydney to Valparaiso in Chile, to determine if a commercial air service was practical over the vast, empty tracts of the Pacific Ocean.

Early in 1951, the Commonwealth Government provided the aircraft, supplied from several still in service with the RAAF Engineers at Rathmines RAAF Base gave the aeroplane a full overhaul, and, at the time of handing over, it had flown only 1600 hours.

After completing the historic flight of over 15 000 nautical miles, 'Frigate Bird II' languished in hangars and sheds in various places around Sydney, and many of the instruments and much of the interior equipment was vandalised.

The Power House Museum, a section of the NSW Museum of Applied Arts and Sciences, is now the custodian for this great aircraft. Before restoration began the remaining internal equipment was removed into storage. The air- frame was treated inside and out with corrosion inhibitor, then the exterior was sprayed silver to return the aircraft to near its original appearance.

The majority of the original radio equipment has been salvaged, but there are still some items missing. An inventory of this equipment, and a list of missing items is given later.



Slipping the buoy at departure, Rose Bay.

THE CREW

The pilot in command of 'Frigate Bird II' won the Military Cross in 1917, in France, for 'taking part in more than 40 offensive patrols at low altitudes and under heavy fire from the ground'.

In 1933, this same airman won the George Cross for his daring actions, when, as a co-pilot, he climbed out on the spars of the 'Southern Cross' over the Tasman Sea and transferred oil from one engine to another. The pilot of that flight was Charles Kingsford-Smith.

In 1944, he commanded a Catalina Aircraft in a proving flight from Acapulco, Mexico, to Australia, via Clipperton Island and the Marquesas Group of islands.

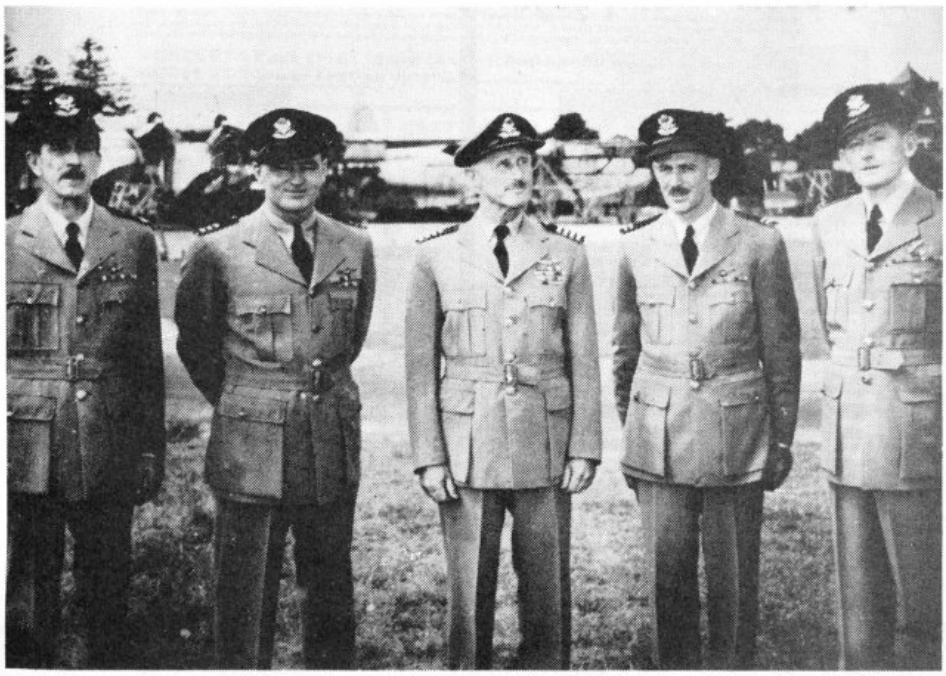
P G (Bill) Taylor was, in 1951, acclaimed 'Australia's greatest living airman'. His cool skill and courage resulted in the successful flight to South America of 'Frigate Bird II'.

Bill Taylor chose well when he enlisted Harry Purvis as his co-pilot for the Chile flight. Harry Purvis had a brilliant career in the RAAF in World War II, was decorated and promoted to Wing Commander. His exploits in aviation during and after the war make exciting reading in his autobiography, 'Outback Pilot'. For many years Harry operated his Cessna aircraft, and his motel at Ayers Rock before finally retiring to Cairns.

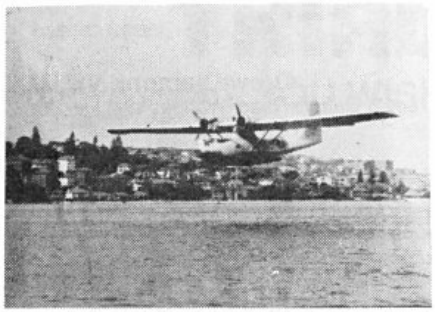
Angus Allison was trained as an aircraft electrician in the RAAF during the war, and later became a Flight Radio Officer with Trans Oceanic Airways, operating in flying boats out of Rose Bay, Sydney Harbour. P G Taylor was a TOA captain at that time, and Angus crewed with him for many years. Part of Angus' many duties with TOA was maintenance of the electronics on their four engined flying boats, and he was able to bring these skills to bear in the operation of the Chile flight.

'Blue' L'Huillier was chosen as flight engineer for the Chile flight for one reason — he was the best. 'Blue' also flew with TOA as a flight engineer, and worked in the hangar on the maintenance of the flying boats. His training, temperament and engineering flair earned him his place in aviation history.

Jack Percival was Executive Officer and Official Correspondent for the flight. Jack had earned his stripes as a foreign correspondent with AAP, and was brought back from an assignment in Korea, to join the flight. Jack Percival was then, for many years, aviation editor for the *Sydney Morning Herald*.



The Crewmen from left — Jack Percival, Harry Purvis, P G Taylor, Angus Allison and Blue L'Huillier.



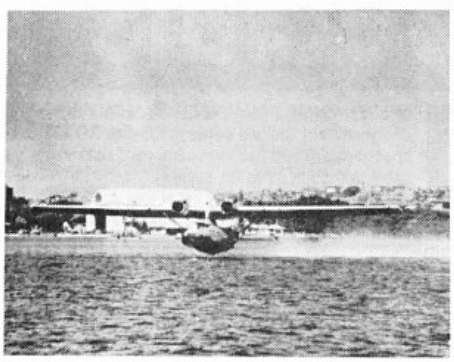
Frigate Bird II lands after a test flight at Rose Bay.

These five men operated the aeroplane under the most strenuous conditions, without relief, for stretches of up to 18 hours continuous flight. They went where no man had flown before. They flew over tiny atolls, the inhabitants of which had never seen or heard an aeroplane. And the bottom line was — "they succeeded".

THE FLIGHT

Just imagine — it is 1951 and you are the Radio Officer of a Catalina Flying boat about to take-off from Rose Bay on a flight that will take you halfway around the world. As R/O it is your job to handle the mooring equipment, so you let go of the buoy cable from the aircraft bollard, slam the hatch closed and scramble through a narrow space between the pilots' seats, back to your station amidships.

The aircraft is now bouncing and swaying around on the water as the skipper revs up first one engine and then the other in the pre-flight checks. You can see the Flight Engineer's feet braced just above you, high above on his elevated perch in the strut supporting the massive wing. You put on your headset and switch the intercom so you can hear the shouted commands between pilots and engineer.



Take-off from Rose Bay for Grafton.

There is a brief calm as the engines are throttled back before takeoff. Final checks are completed. Rose Bay tower gives clearance on VHF, then you see the co-pilot pushing the two overhead throttle levers hard against the stops. The aeroplane accelerates rapidly and you slide sideways in your seat, bracing against the motion. Your log starts to slip off the table and a cold flask topples and goes rolling down the fuselage. After a series of quick bumps the aeroplane is airborne, the engines screaming, slightly out of synchronisation. The co-pilot eases back the throttles, the engine noise becomes tolerable, and a great calm takes over in the aircraft. You think of the old saying, "An aeroplane is safe in the hangar, but that is not what aeroplanes are for."

No time for musing; the aeradio station will be waiting for your departure message. You switch on the Collins ART-13 transmitter and RA-X receiver, tune to 3.985 MHz MCW, tweak up the antenna loading and reach for the Morse key.

'VZSY VZSY de VHASA VHASA, dep hw!'

The reply is a laconic 'K'. He has been waiting for you ever since you spoke with him on the 600 ohms just before going aboard.

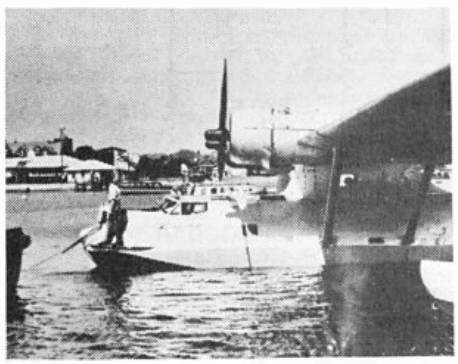
'R VHASA dep VZSD 130140z ETA Grafton 130520z'

'R skeds 15 and 45 cul.'

That is possibly how Angus Allison recalls it from all those many years ago. I spoke with Angus recently about the trip. Much of the excitement is still there, communicated as he related this or that incident. Angus loaned me his album, bursting with photographs and newspaper clippings of the day, so that I may 'get it right.'

The flight proceeded without undue incident, departing from Australia at Grafton on the Clarence River. The flight sectors for the next several days were in easy stages; Noumea, Suva, Western Samoa, Cook Islands and then Tahiti, which was to be a staging point before venturing into the 'unknown'. Easter Island was to be the acid test, landing there in the open sea, and refuelling from drums carried out from shore in an open boat.

The aircraft had been fitted with Jet Assisted Take Off (JATO) rockets at Rathmines, to augment engine power during the open sea takeoff at Easter Island. When tested before leaving Australia, P G Taylor reported the aircraft took off like a fighter plane. Each JATO rocket weighed 90 kg, and provided almost 400 HP for several seconds



Moored in the Clarence River at Grafton.

during the critical takeoff run. Could the airframe stand the stresses of a heavy fuel load, rough seas and the fantastic kick of the rockets, two mounted each side of the fuselage? The crew chewed over this rather hair-raising prospect during the long hours of the flight to Tahiti.

Communications had been good. Angus worked hard at the key, sending position reports, receiving weather forecasts, and passing long commercial telegrams back to Sydney Radio. The 8 MHz frequencies were used into Nadi in Fiji and then to ZKAI, the New Zealand aeradio station at Apia, right through to Tahiti. The French station, FPB, at Tahiti was worked on 8 MHz, but at poor signal strength.

A landing was made at Mngareva, south-east of Tahiti, to refuel. The fuel had been stored under palm leaves on the beach of a lagoon. The crew swam the drums out to the anchored aircraft and laboriously refuelled by hand pump. Whilst on the water here Angus made contact with both Easter Island and Chilean stations on 11 and 6 MHz.

The flight to Easter Island was uneventful, but by arrival time the wind had swung around to make the proposed landing site on the western side of the island a lee shore, with rough seas. P G Taylor landed the aircraft in calmer seas to the east of the island, and anchored near the rocky shore to await the fuel launch. When the boat arrived, the refuelling was carried out successfully. However, the wind veered to the east and the aircraft was prevented from taking off by rough seas.

Angus and Harry Purvis went ashore to find a heavier anchor to help the aircraft rode out the rough seas overnight. But rising seas broke the anchor lines whilst they were ashore and the engines were started to keep the aircraft off the rocks. There was no alternative, other than attempt to taxi the aircraft around to the leeside of the island. P G found that green water was coming up over the propellers as he attempted to taxi into the seas. He swung the aircraft around and drifted backwards, steering by revving one of the other engine together with rudder and aileron. A broken anchor line started to tangle with the propellers, and P G climbed out forward to cut it free. He fell overboard, but managed to grab a line thrown by Jack Percival, and was pulled back aboard.

Eventually the aircraft reached quieter waters and was topped up with more fuel for the 2000 mile flight to Chile. Wasting no more time, a takeoff was attempted, with the JATO rockets fired at the critical moment. The aircraft lurched into the air and climbed slowly towards the east. Chilean radio stations were worked on 4, 8, 11 and 12 MHz frequencies during the 17 hours of the flight, and the aircraft landed at the Chilean Airforce Base at Quintero, right on schedule and into aviation history.

TODAY — 1987

"Frigate Bird II" is due to be moved into the Power House Museum soon, where she will join other historic aircraft that have brought Australia into the frontiers of aviation. Meantime, the equipment missing from her inventory will be sought, by appealing to the nation through the media. The following is a list of the radio equipment originally fitted for the flight, and the asterisks indicate the missing components.

Main Transmitter	Collins ART-13 * Antenna Coupler CJP-47281 Dynamotor CWD-21932
Main Receiver	RA-X1 *
Command Transmitter	T-18 2.1-3.0 MHz T-20/BC-457 4.0-5.3 MHz T-21/BC-458 5.3-7.0 MHz Modulator MD-7 * Dynamotor DM-33 or DY-8 *
Command Receiver	R-27/BC-455 6.0-9.1 MHz * R-25/BC-454 1.5-3.0 MHz R-26/BC-454 3.0-6.0 MHz
Selector Box	ARC-2 (two missing) *
Intercom Box	C-70/AIA-2
Radio Compass	BC-433G Receiver * BC-434A Control Panel LP-21A Auto Loop
VHF Transceiver	SCR-522 * Cockpit Controller *

If you can make any of these missing components (*) available to the Museum, please contact Ian Debenham, Assistant Curator Transport, Power House Museum, PO Box K346, Haymarket, NSW. 2000, telephone (02) 217 0111.

ar

RADIODES

BASIC ELECTRONICS'

When current takes a sudden jump,
Like water squirting from a pump.
It has far more than one effect.
A few of these we shall select —
And briefly here consider.

As current rises in a coil,
Apart from pure resistive toil,
It works and makes by wondrous ways,
Another current — out of phase —
That tries to push it backwards.

If a capacitor now we try,
(Potential must not be too high).
We get another swift reaction,
Bearing a similar reaction —
But now surprisingly, it leads.

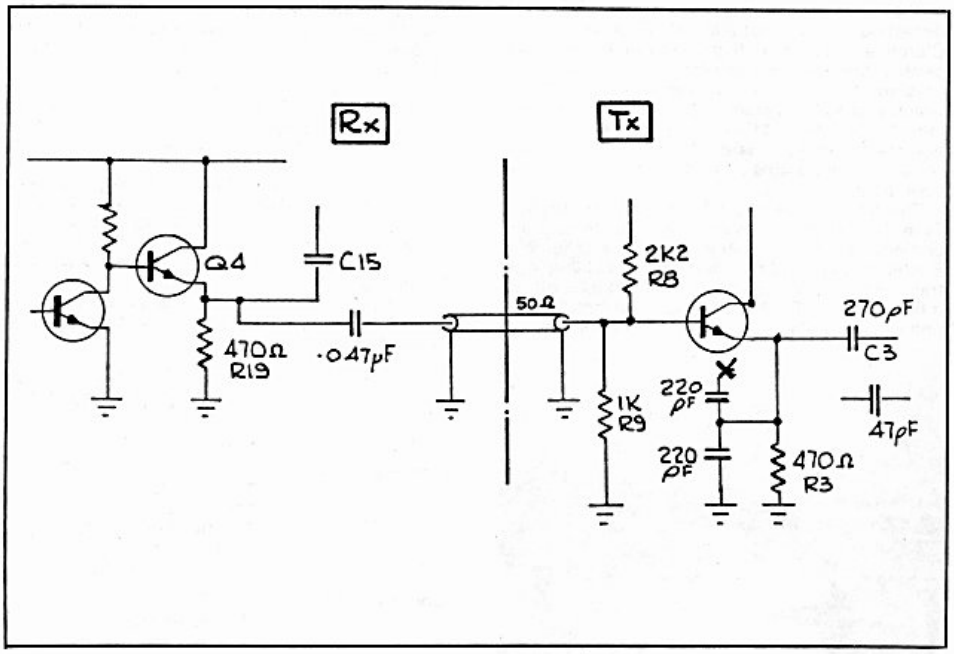
Put alternating current through
Both together — something new. . .
Meter tests — you may make many,
Result, however, there's not any —
In fact the whole thing vanishes!

—"Hambard" (Originally printed in the Nigerian ARS Newsletter 1970s)

Novice Notes

CONVERTING THE DC86 VFO

Drew Diamond VK3XU
Lot 2, Gatters Road, Wonga Park, Vic. 3115



It is possible to use the DC86 Receiver VFO as the VFO for the Four Watt CW Transmitter for transceiver operation by making the following modifications.

ON THE FOUR WATT TRANSMITTER

- Disconnect the top 220 pF styro capacitor (C1).
- Replace the 47 pF NPO (C3) with a 270 pF ceramic.
- Remove the crystal.

ON THE DC86 RECEIVER

- Connect a short length of miniature 500 ohm coaxial cable between the output of the VFO (top of the 470 ohm resistor) and crystal input (where the crystal connects) of the Four Watt Transmitter, inner to the top of the 470 ohm (receive) and "hot" side of where the crystal used to connect; ie base of Q1 (transmit). A .047 uF capacitor must be connected in series with the inner of the coaxial cable.

NOTE

A switch or relay will be necessary to transfer the antenna from receive to transmit during transmission.
(The "on-air" signal may have a slight chirp due to pulling of the VFO frequency by the keyed stage).

REFERENCES

Amateur Radio, December 1985
Amateur Radio, October 1986

ar

Coaxial Cable Specials

Low Loss VHF/UHF Cables

Description	Trade & U.L. Type Number	AWG (Stranding) Dia. in In Nom. D.C.R	Insulation & Nominal Core O.D. Inch	Insulation & Nominal Core O.D. mm	No. of Shields & Material Nom. D.C.R.	Nom. Imp. Ω	Nom. Vel. of Prop.	Nominal Capacitance pF/ft.	Nominal Capacitance pF/m	Nominal Attenuation MHz	Nominal Attenuation db/100 ft.	Nominal Attenuation db/100 m
	**9913** 80C	9½ (Solid) .108 bare copper .90Ω/M' 2.95Ω/km	Semi-solid Poly-ethylene .285	7.24	Duobond II* + 88% tinned copper braid 1.8 Ω/M' 6.0Ω/km 100% shield coverage	50	84%	24	78.7	50 100 200 400 700 900 1000 4000	0.9 1.4 1.8 2.6 3.6 4.2 4.5 11.0	3.0 4.6 5.9 8.5 11.8 13.8 14.8 36.1
						Black PVC jacket.						

BELDEN 9913 low-loss VHF/UHF coaxial cable is designed to fill the gap between RG-8 to RG-213 coaxial cables and half-inch semi-rigid coaxial cable. Although it has the same O.D. as RG8/U coaxial, it has substantially lower loss, therefore providing a low-cost alternative to hard-line coaxial cable. Your special price from ACME Electronics is only $4.84 per metre.
BELDEN Broadcast Cable RG-213/U MIL-C-17D is only $5.23 per metre, or BELDEN 22385 YR Commercial Version RG213, the same specification as 8267, for only $2.14 per metre. *Prices do not include Sales Tax.

For more information about the above, or any other BELDEN cable, simply contact our resident amateur radio operator, Colin Middleton (VK3LO) or our sales department.

Coaxial Cables

Description	Trade & U.L. Type Number	AWG (Stranding) Dia. in In Nom. D.C.R	Insulation & Nominal Core O.D. Inch	Insulation & Nominal Core O.D. mm	No. of Shields & Material Nom. D.C.R.	Nom. Imp. Ω	Nom. Vel. of Prop.	Nominal Capacitance pF/ft.	Nominal Capacitance pF/m	Nominal Attenuation MHz	Nominal Attenuation db/100 ft.	Nominal Attenuation db/100 m
	**8267†** 1354 60C	13 (7x21) .089 bare copper 1.87Ω/M' 6.1Ω/km	Poly-ethylene .285	7.24	Bare copper 1.2Ω/M' 3.9Ω/km 97% shield coverage	50	66%	30.8	101.0	50 100 200 400 700 900 1000 4000	1.6 2.2 3.2 4.7 6.9 8.0 8.9 21.5	5.2 7.2 10.5 15.4 22.6 26.3 29.2 70.5
RG-213/U MIL-C-17D						Black non-contaminating PVC jacket.						

ACME

ACME Electronics

205 Middleborough Rd, Box Hill. Vic. 3128. Ph: (03) 890 0900. Fax: (03) 899 0819

SYDNEY (02) 648 2255 DARWIN: (089) 81 5411
ADELAIDE: (08) 211 8499 PERTH: (09) 272 7122
BRISBANE: (07) 854 1911 HOBART: (002) 34 2811
LAUNCESTON: (003) 31 5545

ACME 709

THIRD PARTY TRAFFIC

ALL YOU WISHED TO KNOW BUT WERE AFRAID TO ASK

HISTORICAL BACKGROUND

The WIA first sought third party privileges in June 1977. The Institute had been concerned for a very long time at the effect of third party restrictions on the ability of amateurs to be prepared for emergencies for the best practice in passing messages is to pass messages. In different States the then existing prohibition was interpreted differently and there was no doubt that amateurs were being inhibited, both in practice and in actual emergency situations.

It is worth pointing out that certain restrictions are essential. The ITU Radio Regulations define Amateur Service. The restrictions imposed ensure that there is no inconsistency between the definition and the privileges sought and gained for the Australian Amateur Service. It should also be pointed out that the prohibition against international third party traffic is also to be found in the ITU Radio Regulations, though these Regulations specifically allow Administrations to agree to the exchange of third party traffic by amateurs between their respective countries.

THIRD PARTY TRAFFIC APPROVAL

In opening the 1980 Remembrance Day Contest, the then Minister for Post and Telecommunications, Mr Tony Staley, announced that the prohibition on third party traffic for Australian amateurs would be removed forthwith. The Department advised the WIA that the conditions to apply would be the same as those used by the FCC in the USA, namely:

"The transmission or delivery of the following amateur radiocommunications is prohibited:

a International third party traffic, except with countries that have assented thereto.

b Third party traffic involving material compensation either tangible or intangible, direct or indirect to a third party, a station licensee, a control operator or any other person.

c Except for an emergency communication as defined in this part, third party traffic consisting of business communication on behalf of any party. For the purpose of this section, business communication shall mean any transmission or communication, the purpose of which is to facilitate the regular business or commercial affairs of any party.

In essence, these conditions imposed three prohibitions. Firstly, there must be no material compensation of any kind to an amateur or any other person. Secondly, the message must be non- commercial. Thirdly, until Australia entered into the necessary agreements with other countries permitting third party traffic, third party messages could only be passed within Australia. These conditions were precisely the conditions that the WIA believed should apply as expressed in their 1977 request.

These third party privileges did not include phone patch, that was a separate matter which has since been negotiated with Telecom, be it on financial conditions less favourable than some amateurs would wish.

THIRD PARTY AGREEMENTS

Following the release of third party traffic privileges in 1980, the WIA submitted, to DOC, a list of countries with whom third party agreements should be negotiated. That list was revised by the 1984 Federal Convention when the following motion by VK5 was adopted unanimously:

84.09.16 The Executive should pursue strongly the matter of Third Party Traffic using the following criteria:

1 All countries with whom the USA has third party agreements
2 All countries in which Australian Service Personnel are stationed
3 The United Kingdom

The country list is shown in Table 1, where the status of negotiation of agreement is recorded. In establishing agreements, DOC first communicates with the other country's communications department and, if indications are favourable, the matter is passed to the Department of Foreign Affairs to formalise an agreement.

As negotiation of a third party traffic agreement takes place on a government level, approaches by individual amateurs are of questionable value, indeed they often set back the cause of diplomatic negotiations. Australian amateurs who wish to extend the lest identified by the motion above (check the USA list before writing!) should work through the WIA who will make an initial approach to the national amateur radio society before conveying the request to DOC for action. In any event, **do not** write direct and embarrass everyone involved. Incidentally, the 1987 Federal Convention resolved to write to amateurs who had made direct approaches advising them of the problems such actions create.

At the 1982 Federal Convention, the WIA Federal Council prepared a Policy Statement on Third Part Traffic. That statement, reference 82.092/1 Appendix C9, is reproduced as an Appendix at the end of this article.

Obviously the motion 84.09.16, given above, elaborates on the last resolution paragraph of this Policy Statement and reflects the most recent views of the council.

RADCOM ACT

The Radiocommunications Act 1983, calls up the following Radiocommunications (Licensing and General) Regulation concerning conditions for communications by amateur stations:

"14 For the purposes of sub-section 25(1) of this Act, the following conditions are prescribed in relation to a licence in respect of a transmitter that forms part of an amateur station:

a the licensee shall not, when communicating with another amateur station, transmit any messages other than messages of an unimportant character in language relating to experiments, or consisting of remarks of a personal nature;

b the licensee shall not, on behalf of a third party, undertake the transmission of messages —

1. that directly or indirectly enable any person to obtain a pecuniary gain or other reward; or
2. that relate to the commercial or financial affairs of any person;

c the licensee shall not transmit messages to an amateur station in a country other than Australia the government of which has given notice that it objects to the transmission and reception of messages between amateur stations in that country and amateur stations outside that country;

d notwithstanding that the government of a country other than Australia has not objected to the transmission and reception of messages between amateur stations in that country and amateur stations outside that country, the licensee shall not, on behalf of a third party, transmit messages to an amateur station in that country unless the government of that country has made a special arrangement with the Government of the Commonwealth with respect to the transmission and reception of messages, on behalf of third parties, between amateur stations in Australia and amateur stations in that country."

The *Amateur Operators Handbook* contains statements similar to Regulation 14 above. The Regulation being of more recent origin should be observed.

In due course, a three leaflet series will replace the *Amateur Operators Handbook*. The second of that series "Part 2 — Operating Conditions" contains the following reference to third party traffic:

"3.2 Third Party Traffic

3.2.1 Transmissions by an amateur station licensee, on behalf of a third party, shall be restricted to conversations/messages of a technical or personal nature.

3.2.2 The licensee of an amateur station, when transmitting messages on behalf of a third party, shall not:

a transmit messages to another country unless that country has made a special arrangement with Australia in relation to the exchange of such traffic;

b undertake the transmission of a message that;
1. directly or indirectly enables any person to obtain a pecuniary gain or other reward; or
2. relates to the commercial or financial affairs of any person.

3.2.3 Except in a declared emergency or natural disaster, the licensee of an amateur station shall not solicit for third party traffic."

DOC have advised that electronic mail, store and forward message systems and the like constitute messages the same as spoken text or CW messages.

It is acceptable to send a message to a person in a country with whom Australia does not have an agreement provided it is passed through another country with whom both Australia and the destinations country have agreements.

SOLICITING THIRD PARTY TRAFFIC

In late 1986, DOC, in order to clarify the issue on soliciting third party traffic, and in elaboration of an *Amateur Radio* editorial, provided the following advice:

* amateur operators should only solicit for messages as an aid to providing third party traffic communications in a declared emergency situation or natural disaster; and
* any advertising for such messages should be conducted in a responsible manner and involve no pecuniary gain or other reward.

DOs AND DON'Ts

Some dos and don'ts for amateurs conveying third party traffic follow;

DO

1 operate only within Australian Regulations
2 know the countries with whom Australia has third party traffic agreements
3 let the WIA know of any additions you wish to be added to the third party traffic negotiating list
4 support the WIA to negotiate initially with the national amateur radio societies for third party traffic acceptance
5 respect other nation's radio regulations even in emergencies as they apply to that nations activities
6 Remain within DOC guidelines if you solicit third party traffic
7 Conduct your third party traffic activities within your capabilities without making promises you are unable to fulfill.

DON'T

1 Pass third party traffic to countries with whom Australia has **not** an agreement
2 Attempt to initiate third party traffic agreements privately either with foreign governments or their amateur societies. You will only create diplomatic embarrassment
3 Attempt to initiate third party traffic agreements in an emergency via DOC until you are clear as to the circumstances and nature of the need. Often the involved nation's emergency plans come into force and your offers may

hinder rather than help. Remember, amateur resources are limited and may be over committed unwittingly.

4 Rush off to disaster areas either within Australia or overseas. The disaster control agency has ultimate responsibility for requesting and directing assistance. For overseas situations, their national authorities must make requests through NDO, who co-ordinate all Australian assistance.

5 Intercept communications and pass the contents to unauthorised parties such as the press or news media.

Table 1: Countries with whom Australia has initiated Third Party Traffic Agreements.

USA	In place and operating
Canada	In place and operating
PNG	Not agreeable
India	Not agreeable
Israel	In place and operating
UK	Being negotiated
Venezuela	Being negotiated
Liberia	Being negotiated
Honduras	In place and operating
Uruguay	Not agreeable
Panama	Being negotiated
Ghana	Not agreeable
New Zealand	Request made
Philippines	Being negotiated
Vanuatu	Being negotiated
Solomon Islands	In place and operating
Mexico	Request made
Mauritius	Not agreeable
Guyana	Being negotiated

APPENDIX — POLICY STATEMENT ON THIRD PARTY TRAFFIC

Given that:

1 The ability of the amateur radio service to provide public service through the use of amateur frequency bands, specialised equipment and knowledge;
2 The ongoing need to promote the amateur radio service to the general public in a proper manner;
3 It is desirable to develop operating skills within the amateur radio service;
4 There is potential for the development of national and international goodwill;
5 The operation of official WIA emergency networks usually necessitates third party traffic;
6 Amateur radio operators have an individual right to choose whether or not to become involved in such third party traffic.

This Council resolves to:

1 Support the use of third party traffic handling privileges by amateurs on all amateur bands and by all interested amateur radio operators, providing strict adherence to the Regulations is maintained at all time;
2 Support official WIA emergency networks providing assistance to official counter disaster agencies;
3 Support the existence of networks for facilitating third party traffic handling;
4 Educate interested amateurs in third party traffic handling techniques, procedures and responsibilities;
5 Promote co-ordination between third party traffic networks and official WIA emergency networks;
6 Continue to pursue the establishment of third party traffic agreements/arrangements with other countries.

ar

ADVERTISE YOURSELF AND/OR YOUR BUSINESS

Amateur Radio has been conducting a new advertising feature for those business people who have a message they want to publicise, yet do not want to place a large advertisement.

Send your business card to the Advertising Manager and it will be reproduced in the magazine, one column wide, for $25.00 per issue.

The Editor reserves the right to refuse any material that he considers unsuitable.

For further details contact:

The Advertising Manager PO Box 300, Caulfield South, Vic. 3162

An Innocent Abroad

John Lingards Sykes G3SRK
7 Hill Top, Lingards Road, Slaithwaite, Huddersfield, HD7 5UA

The plight of a young radio officer. Salt pork and dried peas are not so bad after all!

After less than four weeks experience as radio officer of the coasting vessel S/S *Whitwood*, my employer, the Marconi International Marine Communication Company, considered me ready for deep sea duties. I was appointed to the S/S *Kassala* another coal carrier, but twice the size of my first vessel and loading for Genoa. The romance of my situation, mill worker to merchant navy foreign-going officer in less than 12 short months, seemed almost too good to be true. Italy had always held a special place in my heart, ever since making up my mind to become a radio officer. My boss, Senator Marconi, was an Italian and without him there would not have been any wireless telegraphy or wireless telegraphists, possibly for years to come. Again, as every schoolboy knows, Christopher Columbus was a Genoese and sailed from Genoa to find the New World.

The voyage from Sunderland to Genoa, through the notorious Bay of Biscay, past the mighty Rock of Gibraltar and across the eastern Mediterranean was scheduled to take 12 days and the good ship *Kassala* did it on time. The dreaded Bay of Biscay turned out to be as calm as a duck pond and I was both disappointed and relieved. Gibraltar was as impressive as I had imagined and the Mediterranean was blue and smooth. On the early morning of the 12th day I dressed in my best uniform and was ready to go ashore hours before we tied up. Noticing that the Chief Engineer was still in his working clothes I asked in some surprise, "Aren't you going ashore, Chief?" "I've been here before, Sparks, and I don't think I'll bother the beach this time." His words staggered me and I never guessed how short a time it would be before I echoed them.

I had no duties in port and as soon as the port doctor and the customs officials had completed their routine duties, I was free to step ashore. The Great War had ended just six months earlier. Italy had suffered greatly and could be feeling bitter and I was a bit apprehensive how I would be received; with clenched fists or open arms? I could not possibly have guessed.

Immediately upon walking through the dock gates I was attacked; no, not attacked; besieged, by a host of 20 or more thin, ragged and very dirty urchins all chanting the one English sentence they had been taught: 'Johnny, Johnny, you come sleep my sister, only 50 Lira.'

So that was it! Defeated, they were now endeavouring to convert us by propagating their siesta habit. Certainly they must be in a bad way if beds had to be shared but they were not going to catch me. From the appearance of the touts themselves, it was certain that the beds would have fleas and possibly bugs as well. Besides, it was only 10 o'clock in the morning and I was not going to hang around for three hours just to indulge in an afternoon nap. With great difficulty and only after scattering a handful of small coins, I managed to escape my besiegers and set about exploring my first foreign city.

The city was disappointing, run-down and shabby. The evidence of poverty and defeat was everywhere. Shops empty of goods and the people on the streets empty of hope. The buildings that had appeared white and stately when viewed from a few miles out at sea revealed themselves on close up as dirty gray tenements, dilapidated and neglected. Several times during the course of the next hour I was stopped and, in sign language, asked for a cigarette, but as I was a non-smoker I was unable to oblige.

The few items for sale that I did see looked very cheap in terms of the prevailing rate of exchange though doubtless expensive to the local people. I was particularly impressed by the sight of a magnificent lobster bearing a price tag of 20 Lira (about a shilling). I would buy it and present it to the officers' mess. It would make a welcome change from salt beef and dry hash. The smiling shop-keeper, in response to my pointing finger, lifter the lobster from the window and then picked up a large knife. "No no, total, completo." I signalled that I required the whole lobster at which the patron places it on a pair of scales and said something in Italian. Unable to understand I handed him a pencil and memoed that he should put it in writing. This he did: 850 Lira! Indignantly I pointed to the price tag, 20 Lira. I was informed in passionate language that even I could understand that the price was 20 Lira per 25 grams or just about an ounce and the scales read 1.5 kilograms. With my face redder than the lobster I fled the shop to imprecations very like 'perfidious Alion' as spoken in Italian. It was time to return to my ship and dinner of salt pork and dried peas.

However, returning to the ship proved less simple than I had imagined. I had not taken particular notice of where the ship was lying. After all, the S/S *Kassala* was easily recognisable on account of her yellow funnel. On entering the dock area I looked around for my ship and to my consternation there wasn't a yellow funnelled vessel in the harbour, not one! I was in a state of near panic. Had my floating home been moved around some corner or had she sailed and left me to those sleepy sisters and irate shop-keepers. Where was the British consulate? At the end of a dreadful half-hour, I managed to find an Italian seaman who had a smattering of English and to him I explained my plight. I was told not to worry and that, in exchange for five English shillings, handed over in advance, he would guide me to my ship. Never was money handed over more willingly nor guide followed more closely. We walked not more than a few hundred yards and there was the dear old *Kassala* but now with a *black* funnel. The explanation turned out to be very simple. The ship had been sold whilst on the high seas and after I had left her three hours earlier the funnel and masts had been repainted in the new owners' colours.

Gratefully I ate my pork and peas, followed by rice pudding and prunes, before retiring to my cabin and a British siesta in my own bunk followed by a game of draughts with the Chief. I had had enough of foreign parts for one day!.

ar

PHONE—PATCH HISTORY

Jim Linton VK3PC
4 Ansett Crescent, Forest Hill, Vic. 3131

Phone-patching is an integral part of Third Party Traffic handling, but its approval and use in Australia has had a protracted history.

When the announcement of Third Party Traffic privileges was made by the then Postal and Telecommunications Minister, The Honorable Tony Staley, in August 1980, Phone-patch was assumed by some to be an automatic flow-on.

At the WIA Federal Convention in 1981, (Agenda Item No 81.1201), a motion was passed that "Following the recent lifting of the prohibition against the handling of Third Party Traffic. . .the Executive negotiate with the Department of Communications further to remove the prohibition against Phone-patch Traffic (which appears in the regulations)."

But in May 1981, Telecom produced a policy making Phone-patch "expressly not authorised for personal use" or for use with radio equipment licensed under the Amateur Radio Service, and CB radio. It restricted the availability of Phone-patch to business communications only, and even then it could not generally be used in certain geographic areas — and was restricted to outside cities served by Telecom's Public Automatic Telephone Service which was new and being expanded. Telecom saw the interconnection of radio and telephone as competition to its mobile telephone service.

Preliminary experiments with acoustic coupling were being used by at least one radio amateur to "patch himself" on air to remotely operate his HF transceiver using the VOX mode. An article called "Phone-patching. . .Why not?" (ARA, Vol 4, No 2, 1981) criticising the prohibition on amateur Phone-patch has an almost immediate response from Telecom wishing to set the record straight. A conference was called by Telecom on June 30, 1981, attended by Jim Linton (author of the ARA article) and he invited Alan Noble VK3BBM, to represent the Wireless Institute of Australia. Telecom explained that the so-called prohibition on Phone-patch for the Amateur Radio Service was only a temporary measure so it could separate its considerations of business and private users of radio. This conference, which lasted 90 minutes, was the first occasion that Telecom has discussed Phone-patch with the Amateur Radio Service.

During the discussions some Telecom fears and barriers to Phone-patch for hobby communications melted away. This meeting set the foundation for a continuing dialogue between Telecom and the Amateur Radio Service.

Telecom, at the June 1981 Conference, promised a review of its policy relating to Phone-patch for radio amateurs would be completed by November of that year. To keep the matter moving, a prototype amateur Phone-patch unit was built by *Tara Systems* — Australia's foremost Phone-patch manufacturer for business two-way radio users and essential services.

At 1010 UTC on Monday, September 7, 1981, Australia's first authorised amateur radio Phone-patch contact was made. Telecom had agreed to allow a limited amount of Phone-patching so that amateur Phone-patch operations could be demonstrated — DOC also gave its permission. The first contact involved VK3PC in a 21 MHz contact with VK9ZG, on Willis Island, and patching members of the Weather Bureau Expedition on Willis to relatives in Melbourne (ARA, Vol 4, No 6, 1981). A later demonstration through VK3PC, patched a member of Telecom's engineering staff so that he could assess the facility.

Then,. Phone-patch for the Amateur Radio Service was dealt a body blow when it was learned that Telecom had decided to put the issue of interconnection between radio and the telephone network to the Federal Government's wide- ranging inquiry into telecommunications services, headed by Jim Davidson. This meant that Phone-patch for radio amateurs had been lumped together with considerations about whether business radio users should obtain widespread access to the facility.

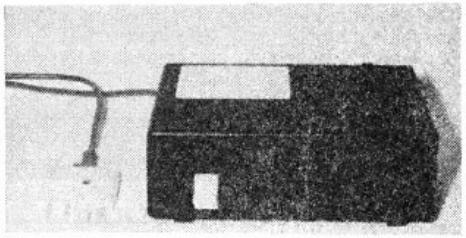
Numerous representations and inquiries were made to Telecom, including a letter-writing campaign to the Minister for Communications, but it was not until September 6, 1983, that a breakthrough came. Telecom announced in a news release headed "Radio Phone-patch connections to be liberalised" that it intended to widen the range of circumstances in which mobile radio could be patched into the telephone network. It said the facility would be confined to specified groups — these included emergency services, amateur radio operators, CB operators and common-interest groups using mobile radio. A Telecom spokesperson said the new policy would allow radio amateurs to use the Phone-patch arrangements already available in some overseas countries.

When the conditions applying to this "Liberalisation" of Phone-patch were released on September 26, 1983, a number of objections were made on behalf of the Amateur Radio Service. These included objections to a prohibition in the conditions on Third Party messages — the key basis of amateur radio Phone-patch — and a $2 a month access charges and socket connection costs.

Telecom agreed on the Third Party objection, and in June, 1985, when it issued revised policy and conditions, excluded the Amateur Radio Service from the prohibition on Third Party Traffic.

On August 6, 1985, WIA Federal Executive member, Jack O'Shannassy VK3SP and Jim Linton VK3PC, met with Telecom representatives to explore ways of resolving outstanding matters. This was followed up with another meeting on October 14, 1985. As a result of the two meetings, special conditions were drafted relating to the interconnection of Amateur Radio Communication Services (see details elsewhere in this article) with the telephone network. Telecom also offered to work with the WIA towards developing suitable circuitry and construction details for an interconnect (Phone-patch) unit which could be Telecom permitted. Within the WIA Victorian Division work was being done to design such a Phone-patch.

At this time, (independently), Sam Voron VK2BVS, who had been intimately involved in seeking Phone-patch for many years, also sought ways of getting a suitable inexpensive Phone-patch unit. A radio amateur, Geoff Donnelly VK2EGD, heard about Sam's desire to have a home-brew unit available and offered him assistance. Geoff works with Telecom's design laboratories in Sydney, and, with approval of his superiors, designed and built a prototype Line Isolation Unit (LIU), to go



between the Telecom line and amateur equipment. After testing, it was refined by Geoff before being sent to the WIA to seek Telecom approval. The LIU has been approved by Telecom and full details are published exclusively this month in the WIA journal, *Amateur Radio*.

SPECIAL CONDITIONS APPLYING TO THE AMATEUR RADIO SERVICE

The normal mode of Phone-patch operation is only a home station and at one end of a radio contact.

In a normal single-ended Phone-patch connection, normal Third Party requirements will apply.

Phone-patch access for mobile units will be permitted via a home station, but not directly via a repeater station. Repeater contacts can be Phone- patched, but only via a home station.

Under WICEN operation, or other emergencies involving natural disaster and/or life-threatening situations, together with unavailability of normal communications, double-ended Phone-patch will be permitted as a special condition. Under duly authorised WICEN exercises, training involving the use of double-ended Phone-patch will be permitted on a self-regulation basis by the Wireless Institute of Australia. The WIA will be responsible for authorising such exercises and will keep a record of such exercises and training arrangements. These records will include the details of the radio amateurs involved, the call signs, and period of authorisation.

This authorisation procedure will be available to any radio amateur wishing to establish local community emergency arrangements to the Institute's standards of service. This can include appropriate community service activities and public displays of the hobby.

The above special conditions, agreed to by Telecom and the WIA, will be reviewed in 18 months.

PHONE-PATCH GUIDELINES

1 Only Telecom approved equipment may be connected to the telephone network.

2 Use Phone-patch in accordance with Department of Communications regulations, particularly in relation to handling Third Party Traffic, and station identification at least every 10 minutes.

3 Brief the phone party on what is acceptable and unacceptable conversation to be transmitted via amateur radio. Any matter which is profane, obscene, indecent or otherwise objectionable is not permitted. Transmissions from Third Parties must be limited to remarks of a personal character for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. Do not hesitate to interrupt a conversation

being patched through your station if you consider it may breach regulations.

4 Explain the patched conversation will be one-way at a time and to indicate that it is the other person's turn to speak they say "over".

5 Keep in mind Phone-patching is dependent on the standard of signal received off air and the quality of the telephone line. A very poor quality patch will not help either of the parties involved or the image of amateur radio. The transmission of poor quality signals from an amateur station is not permitted.

6 Avoid putting to air unnecessary dial clicks and telephone tones.

7 If you, as a radio amateur, use the telephone end of a phone-patch, avoid using your call sign if the transmission is on a band for which you cannot operate under your grade of licence.

LINE ISOLATION UNIT (LIU)

All apparatus connected to Telecom's Public Switched Telephone Network must be authorised by Telecom and have an authorisation number. The WIA "Amateur to Telecom" Line Isolation Unit (LIU) has been given a Telecom authorisation number. Each LIU must be constructed precisely as set out in this article, inspected and then certified by the WIA as meeting Telecom requirements before the authorisation number can be applied and the devise used.

Why not a Phone-patch unit instead of a LIU? The approach taken for the Amateur Radio Service has been to get a LIU authorised by Telecom which allows currently available unapproved Phone-patch units to be used. Later, home-brew Phone-patch unit may be presented in *Amateur Radio*.

The Telecom authorised LIU as explained in this article goes between the Telecom telephone line and the Phone-patch equipment. For example, the Kenwood Phone-patch PC-1 and other similar unauthorised units can now be used in conjunction with the LIU.

DESIGN

The "Amateur to Telecom Line Isolation Unit" has been designed for the WIA by Geoff Donnelly VK2EGD, who works with Telecom Design Laboratories in Sydney. He designed the PCB, built up a prototype, and, after exhaustive testing, decided, in consultation with Sam Voron VK2BVS, to have the WIA submit it to Telecom for official certification tests and approval number. Geoff is to be congratulated for his extremely worthwhile contribution to amateur Phone-patch.

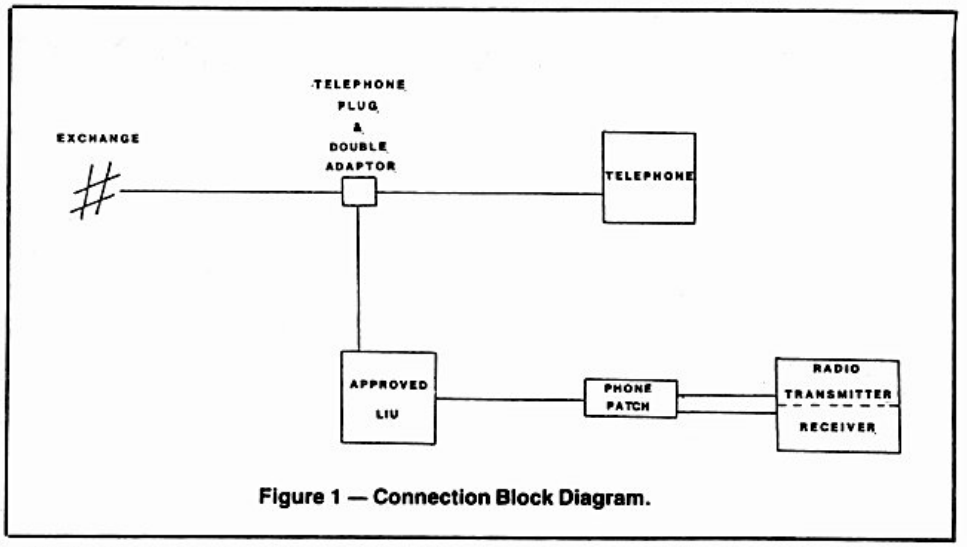


Figure 1 — Connection Block Diagram.

Telecom has agreed to allow radio amateurs to reproduce the original "Amateur to Telecom Line Isolation Unit". Provided the constructed units are identical to the authorised, and certified by the WIA, then these units will be considered as authorised. The precise instructions must be followed to ensure it meets the exacting standards required by Telecom.

AUTHORISATION

The WIA is to be the grantee of the authorisation and will be responsible for ensuring constructors comply with the conditions contained in the authorisation.

Figure 1 shows the method of connection for the LIU in a typical amateur Phone-patch.

The double adaptor places the telephone in parallel with the LIU so that the telephone can be used as a monitor during the patch operation. The LIU is for manual operation only, the radio amateur must be present to set up the call and operate the patch.

Following representations by Sam Voron, special dispensation has been given to the Amateur Radio Service permitting this LIU to be plugged into a normal telephone socket, thus eliminating the need for Telecom to install a special socket.

CIRCUIT DESCRIPTION

The associated telephone must be used to originate and answer a telephone call.

When the LIU is switched "on" it places a DC loop on the line — this will hold a call even is the telephone is hung up. This prevents the operator receiving or originating any further calls so it is necessary to ensure the unit is switched off when not in use.

To indicate the LIU has looped the line the LED will light via a diode bridge and zener. This ensures the LED will light regardless of line polarity which can change during the progress of a call or due to repair works on Telecom lines. The zener and series resistor regulate the current in the LED and keep it constant.

The capacitors across the diode bridge and line are to prevent RF appearing at the diodes and being detected, thus producing unwanted signals on the telephone line. The four 10 ohm resistors also reduce RF injection to the telephone line by providing additional RF impedance. In the event of a fault, the resistors will burn out and provide a little extra safety factor.

The back-to-back diodes and the capacitor on the amateur side of the transformer are arranged to clip any signals on the line to a level of 0.6 volts; signal levels of -10 dBm or less are unaffected.

The LIU electrical test is that it must be able to isolate 3500 volts AC when applied to the Telecom line and any other point on the LIU, including banana sockets and switch.

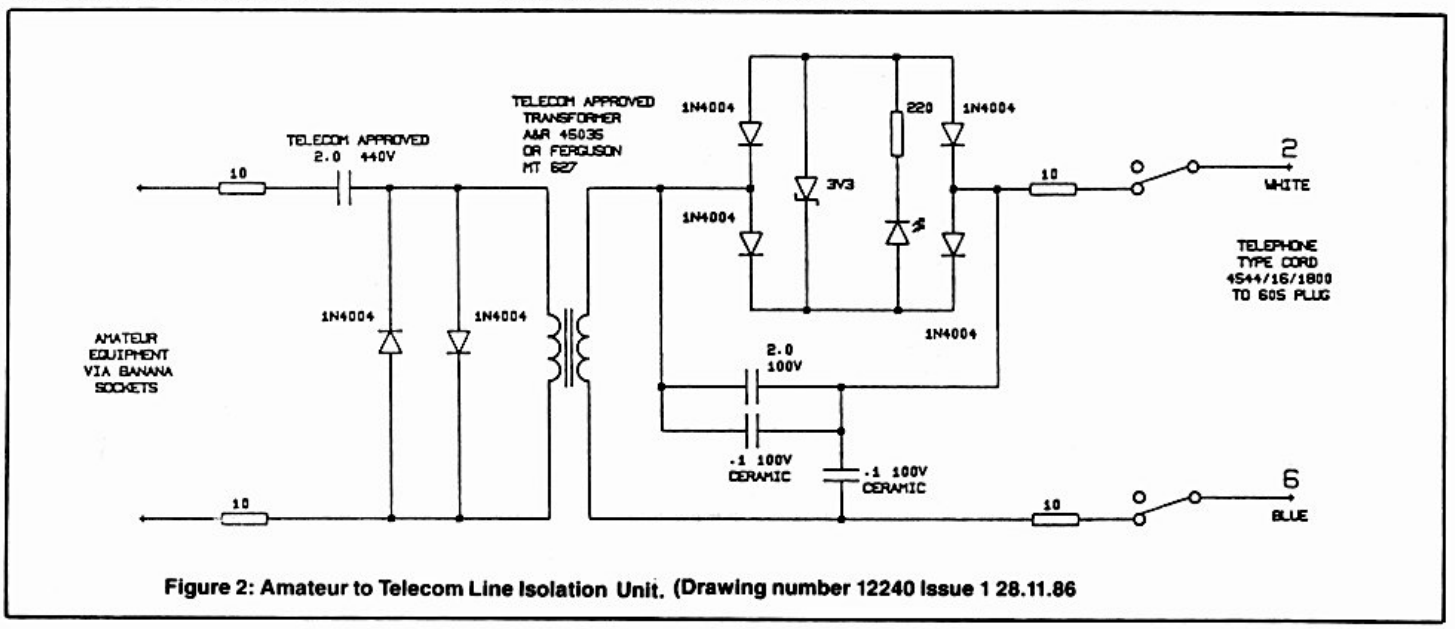
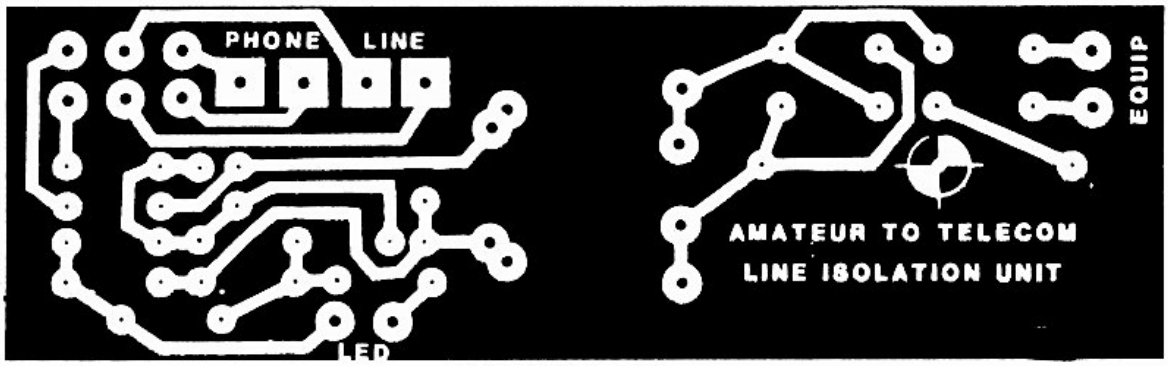
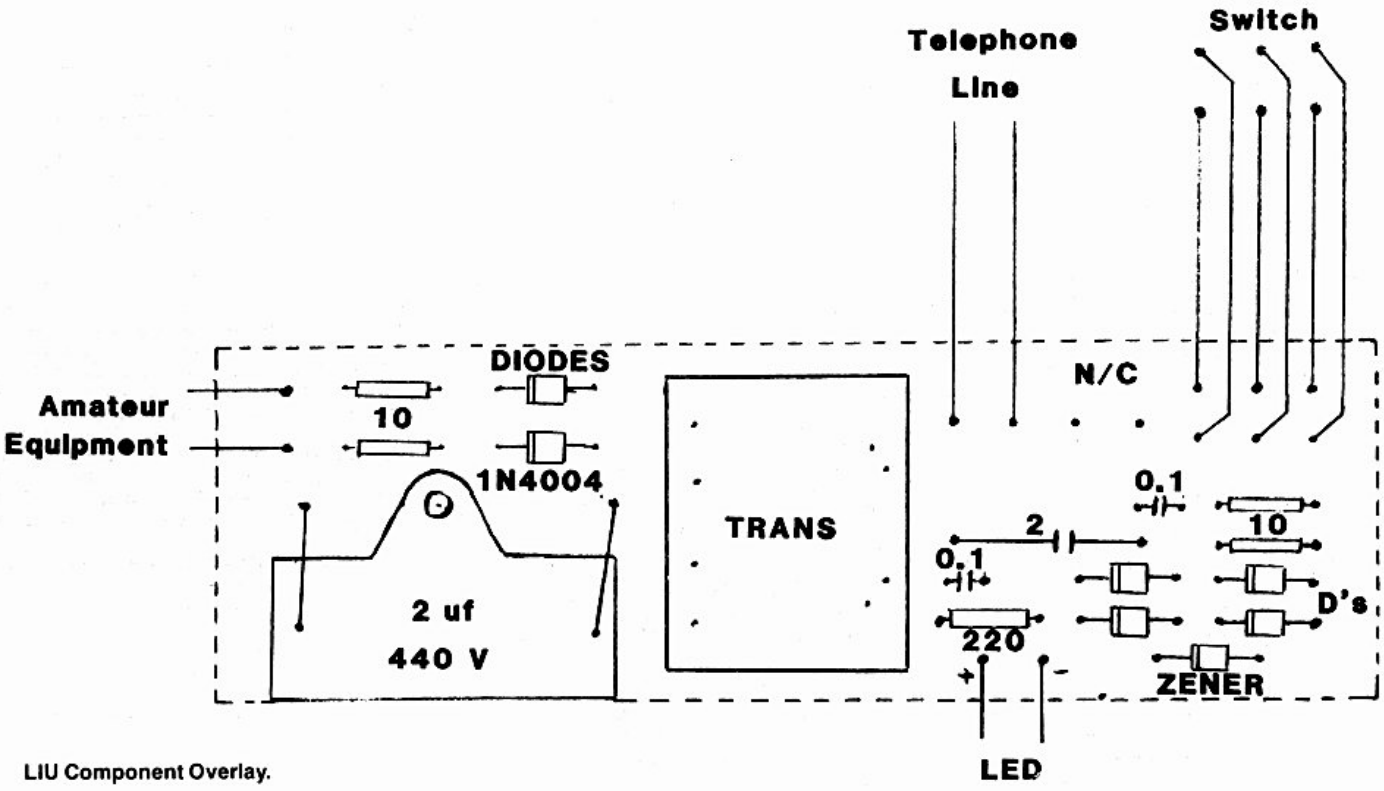


Figure 2: Amateur to Telecom Line Isolation Unit. (Drawing number 12240 Issue 1 28.11.86



Printed Circuit Board.



LIU Component Overlay.

NOTES ON SAFETY

The LIU must prevent both Transverse and Longitudinal dangerous voltages which are or may be present in private apparatus, from reaching the Telecom line. Transverse voltages appearing on the *line side* of the LIU are limited to a safe value (ie below 30 volts AC peak) by the diodes when 240 volts is sconnected across the Phone-patch connection of the LIU. The 2 uF capacitor limits the current to the diodes and thereby prevents their failure during fault conditions.

The transformer must withstand a test voltage of 3.5 kV AC RMS for one minute between windings. The completed LIU must withstand the same test voltage connected between the Telecom line connector and all external private wiring, which is isolated from the line and also any exposed metal of the LIU. To achieve this, the layout of the printed circuit board tracks on opposite sides of the transformer interface must be such that the isolation provided by the transformer is not bridged by close proximity of the PCB tracks (ie the spacing or barrier between tracks must not be less than five millimetres).

The exacting safety requirements imposed by Telecom are designed to prevent dangerous voltages reaching its network which can pose a serious hazard to Telecom staff and equipment. But the LIU level of isolation also protects amateur equipment from any voltage spikes or surges on telephone lines.

CONSTRUCTION

The WIA "Amateur to Telecom" LIU is a relatively simple unit to construct and should be well within the capability of any radio amateur. It has just one transformer, six diodes, a zener, five resistors, four capacitors, a switch, and a LED — estimated cost to make was $50.

Of special importance is the safety aspects of the unit — see the section "Notes on Safety". The unit is constructed in an all plastic box, the control switch is all plastic externally and the PCB layout ensures isolation of amateur and Telecom circuits. Telecom approved transformers and capacitors are used as required.

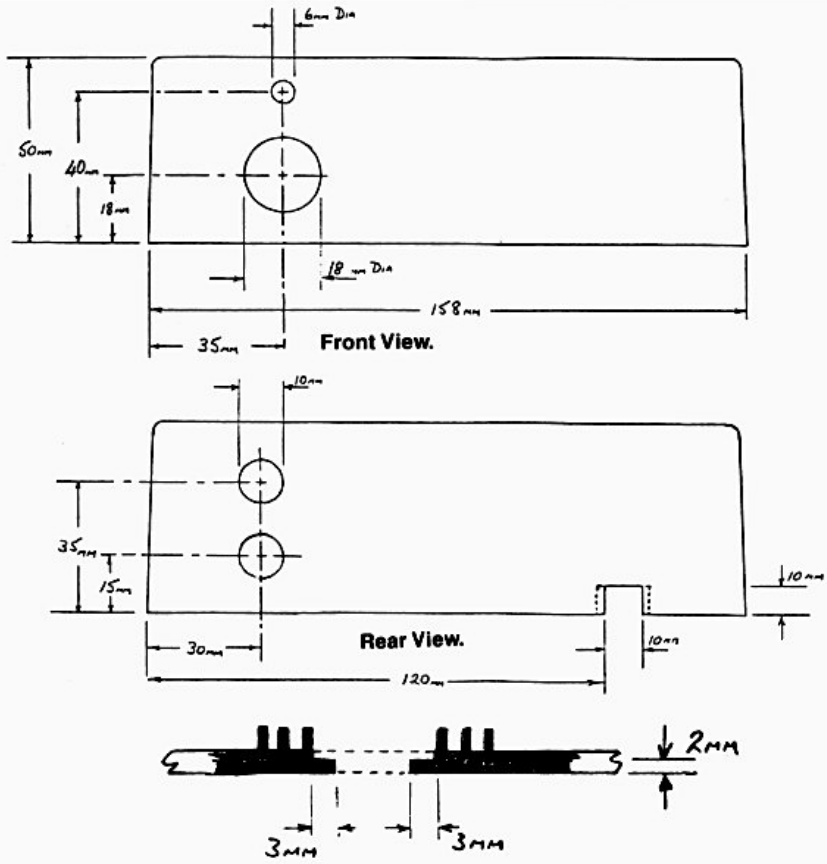
CIRCUIT BOARD

The PCB layout and component overlay are included in this article. However, some amateurs may wish to make their own PCB. If so, it must be fibreglass 0.1 inch thick. The PCB fits directly into the box so no special mounting is needed.

BOX

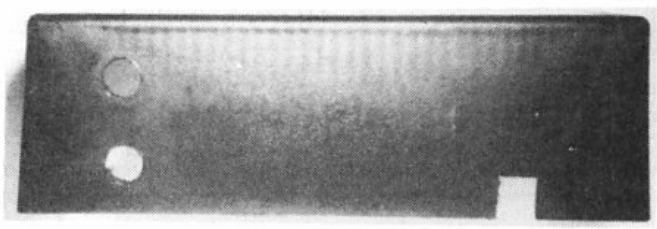
The plastic box is prepared by following the box drilling and cutting detail diagram in Figure 3. The slot for the cord is made by inserting two saw incisions 10 mm down into the box. The waste piece can be broken out with pliers and the slot smoothed with a file. Reducing the thickness of the box wall for three millimetres either side of the slot can be achieved with a chisel — be careful not to cut right through, leave a little extra material rather than taking too much. Check that the Telecom cord restraint fits snugly into the slot. A small area of the box lid rim will need to be filed away to allow the lid to fit around the cord. Inspect the slot with the lid in position and remove the rim material visible in the slot.

Fit the plastic switch to the front large hole and the LED mount and LED to the smaller hole — discard the washers supplied with the switch as they are not required. The two



Slot viewed from Base showing inside wall thinned to accept Telecom cord restraint.

Figure 3: Box Drilling and Cutting Detail.



Rear Panel of Plastic Box.

banana sockets mount into the two rear holes.

The wires joining the switch, LED and banana sockets should be approximately 120 mm long. Use at least three different colours on the switch for easy tracing. Align the PCB switch pads and the switch, and wire each connection one-for-one from the switch to the pads. Rotate the switch so that the LIU is on in the down position. When in the final position, apply a little plastic cement to prevent the switch moving.

CORD

Now to the difficult part — soldering the Telecom cord to the PCB. The cord specified has four conductors. Only two, the white and blue, are now required so cut off the red and black wires. The blue and white wires go to the *line* pads on the PCB — no connection is made to the *phone* pads on the PCB. These *phone* pads were made redundant when Telecom agreed to operating the LIU in parallel to the telephone.

The cord connection is a crimped connector on to a plastic covered tinsel, not wire — this is for flexibility. Heating these crimped connectors excessively will destroy the reliability of the connection, so take care. Use a pair of long-nosed pliers to hold the crimped connector (tag) and solder a small area of the tag. Solder the PCB pads (line only needed) then, while still holding the tag with the pliers, sweat the tag to the PCB. If the join becomes overheated throw the cord away and start again with a new one.

Add the four stick-on feet to the base of the plastic box and the unit is ready for operation.

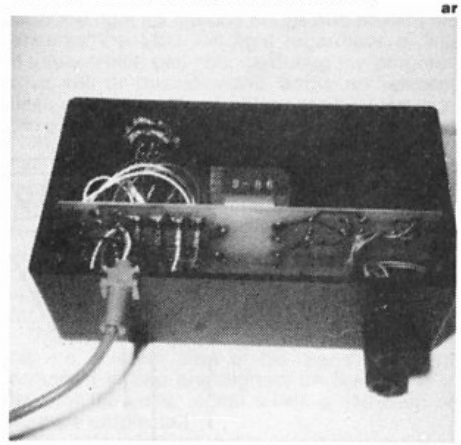
PARTS LIST

The following is a complete list of parts required for the LIU.

1 Transformer, Arlec 45035 Telecom approved.
1 Plastic Box (all plastic) DSE H2851.
1 Switch, DPDT (plastic) DSE S1393.
2 Banana Sockets (black) DSE P1732.
1 Bridge Bypass Capacitor, polyester 2 uF DSE R2140.
1 2 uF 440 V Capacitor, Jaycar EE5120, Telecom approved.
6 Diodes, IN4004 DSE Z3204.
1 Zener Diode, 3.3V 1W IN4728 DSE Z3515.
1 LED 5 mm diameter DSE TL4211.
1 LED Mount "Cliplite CLF 280RTP" C&K Electronics.
4 10 ohm ½ watt Carbon DSE R1226.
1 220 ohm ¼ watt Carbon DSE R1058.
2 .1 uF 100V Ceramic Capacitor RF/Bypass DSE R2360.
4 Stick-on Rubber Feet DSE H1745.
1 Telecom Cord 4544/16/1800.
1 Telecom Plug 605 DSE F5117.
1 Telephone Double Adaptor DSE F5112.

APPROVAL INSPECTION PROCEDURE

To comply with Telecom requirements for inspections and approval of completed LIUs, an inspection officer has been appointed. He is none other than Geoff Donnelly VK2EGD, the designer of the equipment! Geoff hopes to carry out the task on his own. If the demand for certification is much greater than expected, it may be necessary to arrange for an added inspector, possibly in another State. Initially, units for inspection and approval should be adequately packed, marked "LIU for approval" and mailed to VK2EGD, C/- VK2 Division WIA, PO Box 1066, Parramatta, NSW. 2150.



PCB Inserted in Box.

How's DX?

ARCHDIOCESE OF DETROIT

Members of the South-eastern Michigan DX Association will operate Special Event Station *K8JP*, commemorating the visit of Pope John Paul II to the Detroit-area, September 19, from 0001 to 2400 UTC. Operation will be on 10 metres through to 80 metres, both phone and CW.

For a special commemorative QSL card, send QSL, SAE and IRCs to Larry Zabkowski K8NLD, 18082 Gaylord, Fraser, MI 48026.

SAHARA DXPEDITION

Did you hear S0RASD. A special DXpedition was organised by the LYNX DX Group, between August 6 and 16, 1987, to operate the station S0RASD (Republica Arabe Saharaui Democratica). Operators were EA2OP, EA2JG, OH2BH, EA2AJH, F6EXV, EA2ANC, EA2ANH, EA2XC and EA2BXQ.

QSLs for the operation go to Arseli Etxeguren EA2JG, Las Vegus 81, 01479, Luyando, (Alava), Spain.

THE SUNDAY MORNING BROADCAST

Bud Pounsett VK4QY
33 Lassetter Street, Kedron, Qld. 4031

The Divisional Broadcast each week is an essential part of all Division's activities and, in the minds of most amateurs, is a real service.

A good news service keeps the ordinary amateur informed of what is going on in amateur circles and happenings on a worldwide, nationwide and state level. Our weekly news services can bring this information to the amateur and shortwave listener much quicker than the written word such as in our journal, *Amateur Radio*.

A good news service must be formatted to attract as many listeners as possible. Well-informed members are usually happy members who in turn make the life of Divisional councillors happy, too.

To achieve this objective, the service must be interesting, topical and well- presented. The last requirement is very important. In this day and age, people, and that includes amateurs and shortwave listeners, listen to or watch, one or more professionally presented news bulletin every day. A poorly presented newscast will lose listeners and watchers very quickly. Here in Queensland, with the VK4WIA news each Sunday, we strive to reach that goal of professional presentation.

Essentially, a news editor must have his sources of information. As the VK4 news editor, I am very fortunate in having a very good rapport with all council colleagues who pass on items to me. The VK4 Federal Councillor makes sure that I get copies of all manner of papers, letters, newsletters and releases that come from the Federal Office. Many of the State's clubs send their monthly newsletters, and when the occasion arises, letters are received that give further information. Individuals also contribute by telephone or post and point is made of using this material as it encourages them to submit more news at a later date. Of course, a lot of eavesdropping on nets, particularly the Queensland Club Net on Tuesday evenings, is a great source of material.

Having obtained this information, the next sequence is to combine it in an interesting semblance of order. Over the years, a format has been developed that follows the following pattern:

Very Brief Opening
Federal News Insert
Top Priority News (if available)
Overseas News
National News
State News
DX News
Club Notes
Sign Off

The format is not a rigid one but generally the above order is maintained. The VK4WIA news session actually starts at 2255 UTC. The period 2255 to 2300 UTC is taken up with a repetition of call signs and a list of frequencies. This is to enable stations relying on HF propagation to check for the best reception before the news begins.

Exactly at 2300 UTC, the news begins with a brief (about 30 to 40 seconds) announcement with the news reader greeting listeners and introducing herself and then introducing the federal segment. The federal news is always introduced as it gives a smoother presentation and is always back announced such as 'That was Ron Fisher VK3OM' or 'Bill Roper VK3ARZ' as the case may be.

Because the Queensland broadcast is a network effort, there are a number of stations who must identify within each 10 minutes. To assist the relay operators, the identification cue is always the same, 'And now a pause for station identification,' and always with the same voice. A pause for about five seconds and the announcement, 'This is VK4WIA.' At that time the relay operators give their own calls. Following this the announcement, 'You are listening to the weekly news broadcast from the Queensland Division of the Wireless Institute of Australia, coming to you from Brisbane, Australia.' This acts as a buffer between the identification and the next news item. If the first few words of the buffer are chopped, it is of no concern. Again, at the end of the bulletin, a standard sentence is used, '. . . wishing you good morning from VK4WIA.' This alerts the relay operators that the session has finished.

To achieve a smooth presentation, live once per week, is difficult. For this reason the bulletin is put down on tape, usually early on Saturday morning. I am very fortunate that my wife Bonnie, is a good reader and was willing to become VK4WIA's news reader. She is probably the best known non-amateur voice on the amateur bands in Australia. The first tape run has stops, starts and mistakes, although Bonnie does a remarkably expert job of reading matter sometimes quite foreign to her. This is particularly so with satellite and packet items. This reel-to-reel tape is then edited to another reel-to-reel tape and finally on to cassette for delivery to the network manager.

One may ask about last minute items not being included in the news. Last minute items are fairly rare, apart from the unhappy task of advising of a Silent Key. When this occurs, after the final tape is made, the network manager does it at an appropriate point in the broadcast.

The next task is to get it on the air. In Queensland, there is no divisionally owned equipment or even a complete transmitting facility. The news is transmitted on all of the frequencies by individually owned stations and it is quite a team, ranging from Brisbane to many regional centres. The network manager is Jack Gayton VK4AGY, at Woody Point, on the Redcliffe Peninsula. Jack transmits the bulletin to several two-metre repeaters, including Brisbane, Gold Coast, Sunshine Coast, Darling Downs and the Brisbane UHF repeater. The relay stations receive, generally, one of the uplinks and relay it to their assigned band. There is a relay station for each of the bands from 160 through to 10-metres. The 30-metre band is primarily used as a feeder service to regional areas for relay to their two-metre repeaters during this period of poor and uncertain propagation. Use of the 10 MHz frequency for the broadcast, will be monitored for use as propagation conditions improve.

Whenever possible the same people perform the same task each week. However, holidays and other personal commitments do intervene and the network manager has a few standby operators who can fill in. This is not so on the production side. Usually, I am away on holidays when the broadcast is in recess over the Christmas-New Year period, generally a period of three Sundays. One year, we recorded the last session before Christmas and before leaving to go to Samoa. It was a rather odd sensation listening to ones own voice on the Sunday morning broadcast, at noon the day before due to the time difference. There is one other time in the year when a Sunday is missed and that is the Remembrance Day Contest weekend.

How long does our VK4WIA news bulletin last? Just as long as it takes to present it. This is somewhere between 20 and 30 minutes. By putting it down on tape and thereby having a smooth presentation, our bulletin covers much more than a live broadcast in a given time.

After the news is completed, the various relay stations conduct a call-back session while some regional stations have a local news session. There are generally, spread over the various frequencies, well over 100 stations calling in each week. The call signs presently represented are VKs 2, 3, 4, 5 and 8, FK8, H44, KX6, P29, YJ8 and ZL when there is a sunspot minima. With such response, the news team feels that their efforts are not in vain.

For those readers who may like to listen for yourselves, VK4WIA can be heard from 2255 UTC Saturdays (0855 EAST on Sundays in Australia) on one of the following frequencies: 1.825, 3.605, 7.118, 14.342, 21.175 and 28.400 MHz on the HF bands. Also it is broadcast on several repeaters in the south-eastern corner of Queensland and on many regional repeaters. All listening amateurs are invited to call in and give a report and their thoughts on the broadcast. The relay stations will be listening for you on the next and subsequent broadcasts.

ar

REGISTERED BUILDER
(DORAZ PTY. LTD.) TRD.
A.J. & J. COMAN
BUILDERS & DESIGNERS OF:
● NEW HOMES ● EXTENSIONS
● RENOVATIONS & ADDITIONS
● CUSTOM BUILT KITCHENS
● BATHROOMS ● BACK HOE HIRE
57 BULLA ROAD, BULLA
307 1392
H.I.A.

TEST EQUIPMENT
AUSTRALIA'S LARGEST RANGE OF SECONDHAND:
Hewlett Packard
Tektronix
Marconi
Solartron
Boontoon
BWD
Bruel & Kjaer
Oscilloscopes, sig gens, spectrum analysers, multi-meters. Wide range of amateur and communications equipment — valves, coaxial connectors and test accessories. Repairs and service to all makes and models.
ELECTRONIC BROKERS AUSTRALASIA
Cnr Barry Road & Brunsden Street,
Bayswater, Vic. 3153.
PHONE: (03) 729 0455
MOBILE PHONE: (018) 31 2203

VHF UHF — an expanding world

Eric Jamieson VK5LP
West Terrace, Meningie, SA. 5264

All times are Universal Co-ordinated Time and indicated as UTC

AMATEUR BANDS BEACONS

FREQUENCY	CALL SIGN	LOCATION
50.010	JA2IGY	*Mie (Near Nagoya)*
50.075	VS6SIX	*Hong Kong*
50.090	KH6EQI	*Honolulu*
52.013	P29BPL	*Loloata Island*
52.020	FK8AB	*Noumea*
52.100	ZK2SIX	*Niue*
52.200	VK8VF	*Darwin*
52.250	ZL2VHM	*Manawatu*
52.310	ZL3MHF	*Hornby*
52.320	VK6RTT	*Wickham*
52.325	VK2RHV	*Newcastle*
52.345	VK4ABP	*Longreach*
52.350	VK6RTU	*Kalgoorlie*
52.370	VK7RST	*Hobart*
52.418	VK0MA	*Mawson*
52.420	VK2RSY	*Sydney*
52.425	VK2RGB	*Gunnedah*
52.435	VK3RMV	*Hamilton*
52.440	VK4RTL	*Townsville*
52.450	VK5VF	*Mount Lofty*
52.460	VK6RPH	*Perth*
52.465	VK6RTW	*Albany*
52.470	VK7RNT	*Launceston*
52.485	VK8RAS	*Alice Springs*
144.019	VK6RBS	*Busselton*
144.400	VK4RTT	*Mount Mowbullan*
144.410	VK1RCC	*Canberra*
144.420	VK2RSY	*Sydney*
144.430	VK3RTG	*Glen Waverley*
144.465	VK6RTW	*Albany*
144.470	VK7RMC	*Launceston*
144.480	VK8VF	*Darwin*
144.485	VK8RAS	*Alice Springs*
144.550	VK5RSE	*Mount Gambier*
144.565	VK6RPB	*Port Hedland*
144.600	VK6RTT	*Wickham*
144.800	VK5VF	*Mount Lofty*
144.950	VK2RCW	*Sydney*
145.000	VK6RPH	*Perth*
432.057	VK6RBS	*Busselton*
432.160	VK6RPR	*Nedlands*
432.410	VK6RTT	*Wickham*
432.420	VK2RSY	*Sydney*
432.440	VK4RBB	*Brisbane*
432.445	VK4RIK	*Cairns*
432.445	VK4RTL	*Townsville*
432.450	VK3RAI	*MacLeod*
432.535	VK3RMB	*Mount Buninyong*
432.540	VK4RAR	*Rockhampton*
1296.171	VK6RBS	*Busselton*
1296.420	VK2RSY	*Sydney*
1296.480	VK6RPR	*Nedlands*
10300.000	VK6RVF	*Roleystone*

The only matter to report this month on the beacons is another letter from Steve VK4KHQ, at Mount Isa, in response to the letter I had written to him. I mentioned last month that Steve was running a keyer on six-metres and his letter confirms that it operates on 52.060 MHz, between 0100 and 0500, Monday to Friday, using CW with 10 seconds transmit and five seconds receive and the occasional calls on RTTY (45.45 baud, 170 Hz shift). This latter is as a result of his acquisition of a Tono Theta 7000 communications computer which has replaced the TRS80C computer. Steve plans to be on as often as practicable and could be heard at hours other than those indicated. He worked VK5ZDR on 27/5, VK2BHO at 0355 on 12/6 and VK2DDC at 0420, both on SSB after using the keyer. This has confirmed, for him, the need to keep within hearing range during the receive cycles!

Whilst still on the matter of the beacons, I once again impress on the various beacon co-ordinators to supply me with the information requested last month so that any corrections can be made to the published list. Please make sure you do it.

FROM JAPAN

A letter from Yoshi JA1VOK, reports they had a great six-metre opening on June 16/17. He worked KH6JJI at 2230, KH6IJ at 2232, and heard a weak K6MYC/KH6 beacon on 50.110 MHz at the same time on 15/6. The KH6EQI beacon was not heard. Yoshi suggests the 50.110 MHz beacon has replaced KH6EQI? Signals were up to 5x9 plus 30 dB, and the opening remained until 0130 on 16/6. They were heard again the next day from 2145 to 2320. This shows multi-hop Es can be available during the lower part of the cycle and indicates the Northern Hemisphere may be going to have a good summer Es season.

Yoshi said that strong Es signals have been heard on two-metres. He worked many JH6 (Kyushu area) and JR6 (Okinawa) stations from 0140 to 0350 on 210/6. Best DX was JS6AXB on Miyako Island between Okinawa and Taiwan, distance about 1900 kilometres. On 21/6, he worked JA8UGJ, in north Hokkaido, at 0712. The distance was 1100 kilometres.

The Japanese magazine, *CQ ham radio*, courtesy of Graham VK6RO, for May 1987, lists the following stations as having been worked from Japan; VK6RTT heard 1808 on 19/3; VK4RTL heard 1525 on 20/3; VK4FNG at 1538, VK8ZLX at 1608 (and twice later), all on 20/3; VK8ZLX at 1541 on 21/3; VK6RTT at 1555 and VK8ZLX at 1600 on 23/3, also VK8ZMA at 1605; VK4FXX and VK4FWX around 1500 on 28/3; VK4FWX at 1330, VK8ZMA, VK8ZLX, VK4FXX and VK8JH, around the same time on 29/3. A VK3 was heard at 1400.

The June issue of the same magazine carries even more contacts, extending right through to 24/4. Stations being worked include VK8ZLX, VK8ZMA, VK4FXX, VK4FWX, VK8ZCU, VK4ALM, VK4BRG, VK4FXZ, VK4ADT, VK6JH, VK2DDC, VK4FNQ, VK2BA, VK4TUB, VK6YA, VK2QF, VK4JH, VK2BHO, VK8GF, VK6IU, VK6JQ, VK4KAA, VK6KXW, VK6RO, in addition many beacons were heard plus many hearings of VK and ZL television stations. It appears the equinox has provided stations over a very wide area with contacts to Japan, so perhaps my urging for operators to be aware of possible contacts around that time have not gone unheeded. Also, interesting to note, the JAs have also been working KH6, HL1, HL4, HL5, KG6DX, and the occasional HL2. As we start the slow climb out of the low part of the cycle we can expect even more such contacts with an even greater range of stations involved.

The May issue of the magazine carried brief information on a 12 element 50 MHz Yagi on a boom 15.62 metres long, weight of the antenna being 16.2 kg, with a gain of 15.2 dBi, which is about the same as a pair of eight elements without the advantage of lowering the angle due to stacking. So here is an opportunity for those of you who want something really long in your backyard. The design is due to JQ1BSQ, and is called the SS-126.

USING TWO-METRES MOBILE

David VK3AUU, has sent some information covering his recent trip to Broken Hill via Mount Gambier (for the Convention), where I was able to speak to him personally once again. His main purpose in writing was to pass on to newcomers (and others) that two-metres SSB has a lot to offer when it comes to operating mobile.

The unit used is an FT-221 driving a MM linear amplifier. While with Chris VK5MC, after the Convention, they measured 90 genuine watts output and the preamplifier gave a very respectable 1.7 dB NF. The antenna is a horizontally polarised halo attached to a ski-bar about one metre above the roof, fed with a delta match, 4:1 balun and RG8.

First contact was from Hamilton to VK3LK, at Heywood, about 80 km. From there into Mount Gambier he worked VK5NY at Mount Wilson, a distance of 350 to 400 km. A few days later, at Naracoorte, he again worked VK5NY and could hear VK3AIH, at Portland.

On the road to Adelaide, through Keith, the Mount Gambier beacon was audible all the way to Murray Bridge, even while crossing the old bridge into the town. This is just over 300 km. From the hill on the Adelaide side of Murray Bridge, he worked VK5NC, while VK5ZDR was worked with 10 watts output.

The run to Broken Hill proved to be the highlight of the trip. David maintained contact with VK5RO nearly all the way to Olary, which is some 330 km. During this contact he was also able to hear Col working KH6JJI, via OSCAR-10, which was low down on the eastern horizon. After VK5RO disappeared, he was able to work VK5ZDR, for another 20 km. Reports being received back indicated both Col and Mick were receiving David better than he could hear them due to extra noise in the mobile environment.

A few days later, from Cobram in northern Victoria, David worked VK2YEZ, in Griffith, with 10 watts at 180 km.

Concluding, David says it should be noted all home stations were running powers of around 100 watts with horizontally polarised antennas. Except for the first contact with VK5NY, there did not appear to be any enhanced conditions. The distances covered are in excess of twice the range of most FM repeaters and he feels this demonstrates the superiority of SSB for extended mobile work. Thanks for writing, David.

I might mention that, even back in the AM days, I did extensive mobile working with only 15 watts output with a good converter fed into a much improved Command receiver and distances out to 300 km were frequent contacts. Several times I sat on small rises and set up a three element Yagi which resulted in contacts to 600 km and further.

Summing up, I suppose it is just so easy to work FM via repeaters that most have no need to try anything else, but this will not suffice for the DX hound, so the rewards are there if you are prepared to make the effort.

VOICE SIGNALS OFF METEOR TRAILS

"Washington — Strategic Systems Division of GTE Government Systems Corporation has transmitted spoken messages more than 800 miles by bouncing radio signals off meteor trails in obtain in nearly all cases, a narrow exclusive allocation for the amateur and amateur-satellite services adjacent to a wider, shared allocation.

"Unfortunately, in the bands between 420 MHz and 10.5 GHz, we are not so lucky, and there was no possibility at WARC-79 of improving our relative status, at least internationally. Some consideration already is being given within IARU to the matter of objectives for a possible future WARC, and draft suggestions for consideration by the IARU Region 3 Conference, in Auckland, in November 1985, were transmitted to the Conference by the IARU Administrative Council. Briefly, the draft asks that the regions consider the desirability of seeking segments of the 420, 902 (in Region 2), 1260, 2300 and 10,000 MHz bands as primary allocations without relinquishing the remaining secondary allocations. While this process is still in an early stage, I believe it would be entirely appropriate for you to seek WIA support for this approach at the next Region 3 Conference, scheduled for Korea in October 1988.

"The pressures on our access to the microwave bands are bound to increase, both domestically and internationally. I would encourage you to work with the WIA to see that the fine record of Australian support for amateur radio allocations

will continue. 73. Sincerely; David Sumner K1ZZ, Executive Vice- President, ARRL."

That such matters are understood by the ARRL is encouraging to us here and we hope the WIA will continue to do all in its power to try and obtain some exclusive segments, even if smaller than we have been accustomed to, in those bands 420 MHz and above. The band of main concern at the moment is 2300 MHz and the proposed introduction of a number of channels for Multipoint Distribution Systems (MDS). Even a 10 MHz exclusive segment commencing at 2300 MHz would be a great help, even if only to maintain the harmonic relationship from 1152 MHz, one of the prime originating frequencies when one goes higher up the spectrum, eg 2 x 1152 = 2304 MHz.

I am grateful to the Federal Executive of the WIA (via Peter Gamble VK3YRP), for keeping me informed on developments for these bands, and to Wally VK6KZ, for the information he feeds me from time to time.

CHANGE OF ROLE

I note that Ken McLachlan VK3AH, has relinquished his "How's DX?" columns in AR after a period of six years. I have always read his notes with interest as they have kept me informed of happenings around the world in an area away from the generally smaller areas involved in the VHF/UHF scene.

Ken has set a very high standard with his information and a good example of how such a column can be made interesting, something which is always a challenge. I wish Ken well in whatever he does to fill the vacuum (and fill it he will(and await with interest the column to be prepared by his successor. Best wishes from the VHF/UHF fraternity, Ken.

SSB ON MICROWAVES

From Bill Tynan W3XO, and *The World Above 50 MHz*, in *QST* who says that it was not long ago that SSB/CW operation at 10 GHz and above would have been all but impossible for amateurs. However, many are reporting such activity at 10 GHz, some with commercial transverters from SSB Electronics, but quite a few with home constructed gear. But SSB at 24 and 47 GHz!

Bill says; "Just after the June column I received word from WA3RMX/7 regarding work that WB7UNU, and he have been doing on those bands. Last summer they worked over a 115 mile path on the 13, 9, 5, 3, and 1.2 cm (24 GHz) bands using SSB in each case. He disagreed with the proposed 100 mile requirement to be listed in the Microwave Standings in *QST* for bands 24 GHz and above, pointing out that at 47 GHz and above, absorption in the atmosphere and lack of equipment to generate sufficient power to overcome it, make that figure very difficult to attain. He went on to explain that WB7UNU and he had already worked over a five mile path on 47.040025 GHz SSB, and later had extended this to 13.92 miles."

So, all this adds up to some exciting times ahead for those prepared to work and build the required equipment for such bands. Has anyone in Australia anything to report on those bands? Please let me know.

FROM THE UK

I note, in a comment from Steve VK5AIM, that *Practical Wireless* has taken over *The Short Wave Magazine* so I expect we can see a few changes. I have often been able to quote from their columns in the past those matters which seem relevant to us in VK.

I note that the 50 MHz band has been officially released to Class B stations and certain restrictions have been eased, although some European countries are very much against any relaxation of regulation in regard to that band as they have long term plans to use Band 1 for television.

More stations are appearing in the UK on 50 the ionosphere." *Fancy that!*

The report is contained in January 1987 *Aviation Week and Space Technology* and is by Jay C Lowndes, sent to me by Damien Vale VK3CDI, of Mildura, with the comment "The military discover meteor scatter!"

A few other extracts from the same article says; "The division compresses a speaker's voice into digital bursts short enough to reach the receiver before ionised gas trailing a meteor can dissipate.

"Optimum operating frequency is 40 to 120 MHz. Multi-path interference is too great at lower frequencies because normal electron density in the atmosphere is sufficient to scatter the signal. Operation of HF radio is from 5-25 MHz, optimum for total reflection. Electron densities of meteor trails are insufficient to scatter a signal at frequencies higher than 120 MHz.

"The master station has 500 watts of power and remote stations have 300 watts. All stations have a Yagi-Uda antenna of five elements ranging four to eight feet long.

"Two tests last summer consisted of transmissions from Westborough to a receiver near Sebago Lake, at Brownfield, Maine, 120 miles away and to Winchester 418 miles away. Meteor Communications built the 50 MHz transceivers.

"Mr Herman said the maximum range of meteor-burst voice is 1240 miles using a meteor at an altitude of 62 miles, but optimum coverage is afforded at ranges of 360-960 miles. A link as short as 150 miles takes longer to establish because there are fewer meteors between the transmitter and receiver than at longer ranges.

"The largest number of meteors encounters the Earth between 4 am and 10 am because the atmosphere acts as a trap for meteors along the Earth's orbit. Herman said the minimum incidence of meteors occurs from 6 pm to midnight. During the early morning hours, a point on the Earth's surface faces toward the planet's direction of motion in orbit.

"The division's voice-transmission technique uses artificial intelligence to match spoken words to simplified digital signals.

"Voice input from a microphone or telephone handset is sampled and converted into a digital bit string at seven bits/character in the American Standards Institute format called ASCII. The voice recognition system that accomplishes the conversion contains a 1000 word dictionary and was supplied by Kurzweil Applied Intelligence, Inc, Waltham, Mass.

"Encoder software developed by GTE residing in a personal computer then matches the string of characters to phrases stored in the memory, which further packs the data into two bytes/word or phrase for storage in the transmitter buffer.

"The system transmits an idle probe signal that cycles every 20 milliseconds. When a response to the probe from the remote receiver alerts the system that a meteor trail is at the intersection of the transmitting and receiving antenna beams and has an electron density sufficient to complete the link, the transmitter bursts the contents of the buffer to the receiver.

An average meteor trail lasts 300 milliseconds. The four-kilobit/second data rate employed during the GTE tests was sufficient to move 12 words in 48 milliseconds, so one meteor could handle about 70 words on the average, according to Herman, who said hardware is under development for operation at up to 64 kilobits/seconds.

"The processing sequence is reversed at the receiver using GTE-proprietary decoder software and a DEC talk voice synthesiser supplied by Digital Equipment Corporation."

So, there you have the basic idea. It is of particular interest to the military because it is resistant to interception and jamming because signals reflected from a meteor trail cover an area on Earth only 30 miles long by 15 miles wide, and the timing of a transmission burst is unpredictable since it depends upon random events in nature. Some satellite antenna beams cover an entire hemisphere.

Whilst amateurs may not have used these exact techniques, sufficient work has been done in many places to indicate meteor scatter contacts are possible using both CW and voice, so there has been some good pioneering by all parties. Very interesting.

THE MICROWAVE BANDS

Wally Howse VK6KZ, has sent me a copy of a letter he received from the American Radio Relay League Inc (ARRL), dated 17/6 in response to his letter of 6/6 (a fast reply), and as it is very relevant to these columns in view of my comments in previous issues in support of Wally's moves for better understanding of our position in regard to the microwave bands, in particular.

The letter reads, "Your call sign is, of course, well-known to us from your record of accomplishment in the microwave bands, and your concerns are certainly justified. The relative desirability of narrow exclusive versus wide shared bands was discussed extensively during the period leading up to WARC-79. These discussions led ultimately to our being able, in the bands above 10.5 GHz, to MHz and, during an opening on 20/4/87, CT1WW, in Portugal, worked more than 70 stations in the UK. Several beacons are now operating and these are alerting stations to band openings.

In the August issue, a further clarification of the lifting of restrictions is set out. Of interest is that the UK stations have been allocated primary status from 50 to 51 MHz and secondary status from 51 to 52 MHz. The restrictions on portable and alternative address operation have been abolished but mobile operation remains out. The maximum antenna height remains at 20 metres above ground level and power levels remain at about 25 watts for CW and 100 watts PEP for SSB (each as measured as ERP to a dipole). The power levels are to be reviewed at the end of the year.

Also, from *Practical Wireless* is the news that "the sun is now in a period of transition, where the old and new cycles are overlapped with spots appearing together in both latitudes. Three sunspots were counted on 22/4 and 30/4, and four sunspots on 25/4 and one each on the interim days.

"The solar flux was 73 units on 1/4 and then rose sharply to peak at 101 by 11/4. It stayed in the 90s until 20/4, then fell back into the 70s for the rest of the month. The average for April was 85 units. It is almost certain we have passed the sunspot minimum and started Cycle 22 and by the end of the year the smoothed monthly sunspot number should be around 25. The Monthly Mean is the daily sunspot number for each day of the month divided by the number of days in the month. The Smoothed Monthly sunspot number is the total of the last 12 monthly mean sunspot numbers divided by 12."

Incidentally, a graph printed in June *CQ ham radio*, in Japan, showed the solar flux units on a daily basis through April and follows very closely with the figures set out above, although they indicate a peak of 105 units on 16/4 whilst still agreeing with the 101 on 11/4. My Japanese was not quite good enough for me to risk saying something which was a wrong interpretation of the graph, but it is interesting that the information from the UK has allowed me to fill in that gap.

CHANGE OF LOCATION

After living in the same house at Forreston for over 30 years and many more years longer living in the area, VK5LP has definitely decided to move QTH on August 24, and will now be living in Menginie, 148 km by road from Forreston in a south easterly direction and this being about the same distance from Adelaide by road. Air miles from Adelaide are about 70. Meningie is situated on the shores of Lake Albert and is 15 km from the coast which gives it a superior climate to places like Robe and Kingston, which get quite a lot of dirty weather. It should be close enough to obtain some benefits from coastal ducting!

Apart from the milder climate which my health requires, the situation was looked at from a VHF/UHF standpoint, naturally! After trying to share in contacts being made by stations on the Adelaide plains, I eventually had to be content with only working stations at the absolute peak of any opening, which might only be for half an hour or less and then at signal strengths which, to say the least, were most frustrating and this was particularly so on the 70 cm band. Bob VK5ZRO, could work Aub VK6XY, in Albany, at 5x9 +40 dB on 70 cm and I might be able to work him at 4x2! My 60 dB hill was a good attenuator to the west! Despite all the problems, I did achieve a goal I had set many years before, that of Working All States on two metres, which I finally did when I worked VK8GF, in Alice Springs, December 1985. It took 25 years of hard work but I do have a certificate now to prove that it was done and from the same location for all contacts. I now need VK4 and VK8 on 70 cm to achieve WAS on that band.

The Meningie location looks very good. There is a small rise looking west about two kilometres

away and, right next to me is a small rise looking south-east. Both of these can be looked over with an antenna height of about 35 feet, which is less than half the height I have been accustomed to at Forreston. After getting over these rises, there is nothing in the way, being water right to Albany in the west, and water and undulating country to the south-east, Melbourne and Tasmania. In all other directions there is nothing in the way that can be seen and this will give me a much needed incentive to become more operationally active than I have been for sometime now.

I may not be able to have the large antenna arrays I have become used to, but then again I really won't need them. But, I plan to have the best antennas I can arrange for 52, 144, 432, and 1296 MHz, the first two will sport new coaxial cable and the latter two will be fed with heliax, and all bands will have masthead amplifiers. Fortunately, the television reception is very good at Meningie, where average antennas are used and no masthead amplifiers are necessary, so i do not really anticipate much in the way of TVI.

The house is a two storey place on the corner of West Terrace and South Terrace, but I propose using West Terrace, Meningie, SA. 5264, as my address and with a number for the house eventually. For the present, that above address will be redirected for the time being. We will be living in the upper storey and the shack will be downstairs where everything will be done whilst walking on carpet! What a change from concrete floors and mats. Even my workshop will be located in the same area, so if it is a really cold day I don't need to go outside at all, which should be a help.

As uprooting oneself after such a long time is an awesome task, it will be awhile before I can become fully operational, but I would hope to be operational in time for the summer Es season on all four bands. I will keep readers informed.

As I have said previously, I have reluctantly had to accept that my planned EME operation has had to be abandoned despite all the work I have done on the dish. In its place I want to do some work on the bands up to 10 GHz if this is possible, at first concentrating on 2304 and 3456 MHz and hoping to exploit that water path through to Albany and to Melbourne. It will be a challenge but at least I should have a start in having a location which should make these bands a possibility for satisfactory operation. I also want to work Wally VK6KZ, on 576 MHz! I am also looking, with interest, to Alice Springs and Peter VK8ZLX, for a 70 cm contact before long when he completes the upgrading of his equipment; and, in view of what Roger VK5NY, almost accomplished last year on 70 cm to Brisbane, that State is not as remote for that band as it may seem. Who knows what the future holds?

Having now come to terms with the idea of shifting (my family group has been in this area since 1854) I am at last becoming a little excited at the possibilities the location at Meningie offers, especially after having been virtually suppressed for 10 months of the year at the Forreston location.

CLOSURE

Unfortunately, there is really little I can report on the bands at present, mostly I suppose because I have been off two-metres for some time due to rotator trouble and, with the impending move, the 70 cm system has been dismantled, leaving only six-metres to be attended to in the next couple of weeks. My weekly scheds with Mark VK0AQ, will also be terminated for a while and there will be a need to decide what form of HF antenna one can use on a normal house block — there is no room on my towers for HF beams!

So, until next month, I close with two thoughts: "An adventure is an inconvenience rightly considered; an inconvenience is an adventure wrongly considered" and "The first man to tear a telephone book in half undoubtedly was the father of a teenager."

73, The Voice in the Hills (soon to be changed!)

ar

NOTE NEW ADDRESS AT HEAD OF COLUMN!

Intruder Watch

Bill Martin VK2COP
FEDERAL INTRUDER WATCH CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW. 2077

Unfortunately, I open the column this month with sad news, having heard that Henry Sporrer VK2DUO, became a Silent Key during July. Henry was a good supporter of the Intruder Watch, and we will miss him. On behalf of the Intruder Watch I offer condolences to his family.

May 1987, brought no startling news to the notice of the Intruder Watch, but we received good support for the month from:

VK2s EHQ, NRR, PLL, Arthur Bradford; VK4s AKX, BG, BHJ, BTW, DAM KHZ; VK5TL; VK6RO; VK7RH and VK8s JF and HA.

There were 68 AM-mode intruders reported, 129 using CW-mode (A1A), 88 intruders were reported using RTTY (F1B mode), 46 were using other modes, and 22 intruders supplied us with their call signs.

A common intruder, reported as "EEARQ", using CW, is believed to be really the Vietnamese intruder "VRQ", sending poor identifications. A letter to the Indonesian Amateur Radio Society, *ORARI*, seeking help in the problem of commercial traffic on 14.051 MHz in the CW-mode, has brought no response to date. I sometimes wonder if anyone really cares if their amateur bands are used for anything from passing traffic relating to the sale of timber, to politically-motivated propaganda. (Concerned amateurs excepted, of course).

The number of pirates reported on the 28 MHz band from IARU Region 1 who are located in Spain and Italy should make us thankful here in VK that we do not suffer the same problem.

The two common intruders to both Region 1 and to us here in Region 3 are, however, Radio Tirana (Albania) and Radio Beijing (China). The absence of both these transmissions would see us much better off, particularly on the 40-metre band. *We live in hopes . . .*

The reading of the DARC (West Germany) Intruder Watch Summary brings me back once again to the proliferation of CB operators originating in Spain. Ulrich DJ9KR, the DARC IW Co-ordinator, has, in his summary for May 1987, listed approximately 60, (Yes **60**) CB operators, all located in Spain, who have been using our 10 metre band, and giving their QSL addresses out on air! Armed with this information, I am prompted to ask why their local administration cannot do something about it? Of course, there are many questions without answers in this life, aren't there?

So there we are for this month; thanks to all those who are lending a hand, and I hope to hear from those who have yet to contribute the odd report to aid the preservation of our exclusive amateur bands of frequencies. See you in October.

ar

BEACON/REPEATERS

Tim Mills VK2ZTM
FTAC BEACON CO-ORDINATOR
PO Box 204, Willougby, NSW. 2068

YOUR INVOLVEMENT IS REQUIRED

One of the agenda items raised at this years Federal Convention concerned the determination of a national standard access tone for FM equipment and operation. The item was submitted by VK2 and was agreed to in principle by all States. The Federal Technical Advisory Committee (FTAC), was directed to investigate and determine a suitable standard/s and to report back to the Federal Council.

Currently, in Australia, there is no standard for tone access systems for the Amateur Service. Without a standard there is a wide range of equipment available for purchase which is either fitted with a tone system or is available as an accessory.

BACKGROUND

When permission to develop repeaters was granted in Australia in mid-1968, one of the conditions was that all systems had to be open access. Overseas there has been the tendency to use some form of tone access. In Region 1 (Europe) it has usually been a tone burst at the start of transmission, automatically or manually applied for a part of a second, using an audio frequency round 1750 Hz. This opens the repeater and then allows it to operate as a Carrier Operated Relay (COR) until time out is reached or there is another burst of tone to reset the timing period.

The alternative tone system employs a continuous sub-audible tone whenever the transmitter is on air. This approach tends to be used by the private or closed repeaters in the USA. It is also used in the two-way radio industry, particularly where channels are shared by several users. By 1995, all Australian (commercial) systems will require a form of coded and identified access. The sub-audible range used is from about 60 to 200 Hz.

Without the need for tone access in the Amateur Service no standard has been developed in Australia. It is not envisaged that this current research is to require tone access to be used in place of the present COR control. However, the increasing pager interference on two-metres, or perhaps shared channel access on six-metres, is a possible use for an access tone system. It has been felt that a standard should exist to enable manufacturers to include or make provision for a common system, if and when the need arises.

The line of thinking has been for a sub-audible system, as the encoding and decoding facilities are standard and existing technology. The suggested frequency in the agenda paper was 123 Hz. It is firstly a whole number and falls in the mid-range. If the chosen frequency is too low, it suffers attenuation in the (radio) audio system. If it is too high it becomes audible to some listeners not unlike a 50 Hz hum.

FTAC now seeks an indication of interest from all amateurs. Please register, by writing to FTAC, WIAFE, PO Box 300, Caulfield South, Vic. 3162, or to the address at the top of this column. Alternatively, you may ring the Federal Office on (03) 528 5962 or the VK2 Office on (02) 689 2417 to register. Further technical background may be obtained from your Divisional Federal Councillor. If you already have thoughts on the subject, commit them to the written form of expression and forward to FTAC.

Information will also be included in the news broadcast.

ar

MOSQUITO AIRCRAFT RESTORATION

Keith Muller
C/- Department of Aviation, PO Box 24, St Marys, NSW. 2760

In *Amateur Radio* July 1986, an article was published telling the story of the restoration of Mosquito aircraft, A52- 319.

As the writer of that article, I endeavoured to stimulate interest in the proposed restoration of A52-319 for the Australian War Memorial, Canberra.

I hoped there may have been a fleeting interest by a few of the Wireless Institute members concerned with the future of a wonderful piece of Australian Aviation Heritage.

Not in my wildest dreams did I expect the flood of WWII memorabilia that was made available.

The original article requested specific equipment for the Mosquito's inventory, however members sent articles of a military nature as well and these were subsequently sent on to the Australian War Memorial, who benefitted greatly from this bonanza.

It is wonderful to know there are people in this world that have managed to protect articles of such historical importance, as so much has been destroyed in the past.

Recently a book was published in England by the author, Stuart Howe, with the title *Mosquito Survives*.

This publication tells the story of 28 individual Mosquito aircraft around the world that have survived the ravages of 40-odd years and, with the small miracles and hard work by devoted restoration teams, to rebuild these aircraft.

In some cases they were bare skeletons of aircraft used as hen houses in New Zealand, or rotting in a kibbutz in Israel.

Restoration, in most cases, has reproduced the sleek beauty of DeHavillands masterpiece that helped us enjoy the mode of living we now have, by out- flying the enemy of the WWII years.

Meanwhile, back to our Mosquito, A52-319, at Hawker-DeHavilland (Aust).

John Chadwick has organised the rebuilding of the broken fuselage, the control surfaces, the two Merlin engines and numerous parts of the general aircraft.

The wings are the next important project requiring much expertise in woodworking-techniques as a great amount of damage occurred due to neglect of the past years.

The radio equipment restoration is progressing with the HF radio T1154/R1155 nearing completion and looking good.

The SCR-522/TR-5043 VHF equipment outwardly looks great but is yet to feel 28 volts surging through its veins!

We have almost all of the ancillary equipment for the DF side of the R1155 Marconi HF receiver.

An IFF set, SCR-695/BC-966 was presented, but the genemotor with coding gear box is still required. Also, the control box for the IFF.

A Loran has eluded us to date! The AN/APN-9 Loran was used in the Australian design PR-41 Mosquito.

An inverter, PE-206-A was donated. This is the 115 volt 400/1100 Hz power source for the AN/APN-9 Loran set, so it is hoped some kind person will complete the radio inventory with the donation of a Loran set.

It is intended that all the radio equipment will eventually be in working- order, making A52-319 a rare model amongst the remaining Mosquito aircraft in the world.

At this point, I would like to indicate the gratitude of the Australian War Memorial with Mr Bob Cowley, the Curator of Military Technology, expressing his thanks to all members kind enough to donate their treasures of the past, in many cases, real personal memories.

As in the last article, should you wish to help complete A52-319, please contact the writer at Department of Aviation Transmitter Station Llandilo, NSW, phone (02) 628 9777 or (02) 628 9466, or write to the above address.

Some of the minor articles still required are:

- Servicing or operating manuals for the AN/APN-9 Loran and SCR- 695/BC-966 IFF.
- Open black rubber coated Air Ministry earphones.
- WWII oxygen masks.
- Air Ministry khaki cloth or leather helmets.
- The open-type Loop Antenna as used in English aircraft.
- Two-pin Cannon power supply plugs for the PE-94-B power unit used in the SCR-522 equipment.
- Valve types transmitter pentode VT-104, power triode VT-105, type 6SC7 and thyratron 2051.
- The Londex relay type 220 with resistance unit type 52 or 52A for the HF T1154/R1155 rotary power unit voltage regulation.

These components would be very rare but, judging by the response to the July 1986 request, it would not surprise me if they became available.

I would like to add my personal thanks for all the donations and good wishes. It certainly helps on a project of this size.

'Safegard' your life!

Portable Scanelec Safegard units help prevent electrocution. Ideal for tradesmen or the home handyman. Portable, tough and reliable. Portable Scanelec Safegard. Your own electrical bodyguard.
For further information telephone your local Utilux office or Scanelec on (02) 500155. Telex: 121516 Fax: (02) 5021753.
Stay Alive — a must for every building site.
Ask for Model KP210-30.

UTILUX
people with imagination

Spotlight on SWLing

Robin Harwood VK7RH
52 Connaught Crescent, West
Launceston, Tas. 7250

Recently, I have been fortunate in having the opportunity of using a Tono Theta 777 modem. This unit is designed to go between the receiver and a computer terminal and can be used on several modes. I was very impressed with its versatility, once I had mastered how to program a computer, something I had previously not attempted. The unit requires an RS 232 interface and not all TUs have this, especially the Commodore, yet this can be overcome. I strongly urge you to check if your TU has an RS 232 compatibility, as I am aware of one individual who obtained this modem, only to find his computer did not have the RS 232 socket. Fortunately, he was able to obtain information to have an RS 232 to plug through his TU, thanks to VK7NRR.

It was very interesting, comparing the performance with my own Tono 9000E. A plus for the Theta was the ability to receive ARQ and FEC traffic (AMTOR). Although I did find it difficult to get an accurate readout, due to adjacent signals, compared to RTTY. The number of amateurs on AMTOR has steadily increased over the past years, judging by the traffic on or about 14.070 MHz.

Another plus for the Theta is the ability to automatically track Baud rates on RTTY. This provided some surprises as there are a few commercials that don't send exactly at standard rates. For example, the Korean Central Newsagency, in Pyongyang, was tracked at 53 Bauds. But the Theta had trouble in tracking BIT inversion RTTY, yet this may be well due to my inexperience. Incidentally, it is virtually impossible to get a readout on BIT inversion, unless you happen to know what multiple combinations are being employed.

Most RTTY signals are using BIT inversion in some form, although some are still using plain language. Unfortunately, fewer press agencies are now on HF each year, most having gone to satellite or cable feed. I find that the only consistent RTTY copy is from stations sending meteorological information in the METEO format, which is internationally recognised.

Conditions have gone down over June and July, as the Solar Flux dropped. In the daytime, there were plenty of European and North American signals, with Middle Eastern signals coming through early in the afternoon. I am pleased that this location seems better than where I was previously, although I suspect that it is more likely to be the antenna direction. South Americans do not seem to be better, especially on the tropical bands. Also, Africa is hard to hear, mainly because there is a hill to the west of me, which effectively blocks signals from that area, yet the low solar flux could be contributing as well.

Don't forget that there are two broadcasting periods starting this month. The first one commences on Sunday, September 5, from 0100 UTC and is known as the S87A period. The second will be Sunday, September 26, when Europe goes off Summer Time. This is the S87B period. Broadcasts beamed to European audiences will be one hour later. Also, the Peoples' Republic of China goes off Summer Time on September 13, so domestic programming will be one hour later there also, as will international stations with Chinese language programming. This is only the second year that the PRC have adopted daylight saving.

Another nation that experimented with Summer Time this year was South Korea, but it did not affect its external broadcasts.

It has been officially confirmed that the ABC Networks will be operational for 24 hours permanently. The Metropolitan and Regional Networks commenced on Saturday, August 1 and the National Network is to commence on October 1. This in itself is going to be interesting as they are going to relay Radio Australia on MW between midnight and dawn, enabling listeners overseas to hear Australia on MW. The drawback for us is that it will deny Australian DXers the opportunity of trying for DX signals, on ABC channels. Also, there are a significant number of Australian commercial stations operating 24 hours.

There are various ways around this, primarily the erection of a MW loop. These do work surprisingly well, especially with a preamplifier added to it. Bob Padula, in Melbourne, recently resurrected his loop antenna and was surprised to hear some DX signals around local sunset. This has prompted me to consider erecting a MW loop myself to compensate for the ABC operating around-the-clock.

Incidentally, I am consistently hearing American commercial MW stations, particularly on 1.540 MHz. I have heard them as early as 0730 UTC and as late as 1200 UTC. There appears to be several stations on frequency. Recently, I was fortunate to be able to utilise Andre VK7AE's Beverage for 160 metres, at North Riverside. Despite the transmitter for 7LA being only 300 metres away, I was clearly able to hear the Americans. Fortunately, 7LA have since relocated their transmitter across the river at Rocherlea. They are now operating with five kilowatts. Perhaps reception will be better now. I know that Andre is no longer getting RF sparks around his antennas and the hash and birdies have gone. I expect that he will pop-up on 160 metres before too long.

The other news for July is the sudden appearance of RS 10 and 11. There will be plenty written about it in the AMSAT column, so I am not going to duplicate it here. It has certainly been interesting noting when 15 metres comes through, that multipath signals are retransmitted, and there is a characteristic flutter compared to the QSB from signals within the footprint of the satellites. By this time I hope to have worked through the satellite.

Well, that is all for this month. Until October, the very best of 73 and good monitoring!

Robin VK7RH
ar

Awards

Ken Hall VK5AKH
FEDERAL AWARDS MANAGER
St George's Rectory, Alberton, SA. 5014

The Basic (Western Third) Certificate of the Ten-Ten International Net Inc, Twenty Eight Chapter. (See June AR, page 52 for rules of the award).

AWARDS ISSUED IN MAY AND JUNE

WAVKCA

1535	Riga Club Station UQ1GWW
1536	George Khodjaev UA4PW
1537	Juri I Vucolov UA4FZ
1538	M B Mezhlumov UI8OAA
1539	Alan J Abel ZL2QR
1540	Hiromi Soga JI1FJV
1541	Toshi Tayama JM1BRP
1542	Jo Moon Ho HL1LW
1543	Benny Wyenantea YB3CN
1544	Alan Viegas VK8AV
1545	K D Gott VK3AJU

HAVKCA

126	Segy V Makhota UA6-101-373
127	V V Shishko UD6-001-220
128	Vladimir Ulyanov UA3-151-408
129	Vlad Prostomolotov UA4-152-2
130	Vladimir P Shalun UB5-073-1610
131	V I Zinchenko UA3-170-372

WAS VHF

171 J McGrath VK4JM (52 MHz)

DXCC PHONE

356 Des Hancox VK2AGA

DXCC CW

129 Les Hawkins VK4DA

DXCC OPEN

236 Les Hawkins VK4DA

DXCC UPDATES

VK2BQS	169 open	
VK3OT	302(4) open	299(4) phone
VK4LC	307(35) phone	
VK5MS	316(47) phone	

Contests

Frank Beech VK7BC
FEDERAL CONTEST MANAGER
37 Nobelius Drive, Legana, Tas. 7251

CONTEST CALENDAR

SEPTEMBER

12 — 13 European DX Contest Phone Section
19 — 20 Scandinavian Contest CW Section
26 — 27 Scandinavian Contest SSB Section
26 — 27 CQ WW DX RTTY Contest

OCTOBER

3 — 4 VK/ZL/Oceania Contest Phone Section (Rules August issue)
10 — 11 VK/ZL/Oceania Contest CW Section (Rules August issue)
11— RSGB 21/28 MHz SSB Contest
— 18 RSGB 21 MHz CW Contest
24 — 25 CQ WW DX Phone Contest

NOVEMBER

7 Australian Ladies' Amateur Radio Association Contest
14 — 15 European DX Contest, RTTY Section
28 — 29 CW WW DX CW Contest

The contest news for this month will not be as extensive as that provided by Ian VK5QX, the past FCM, who has supplied readers with a wealth of contest news and helpful information over the years. Ian has also given me a great deal of assistance during the changeover period. Maintaining lines of communications and locating new sources of contest information will be given a high priority.

I have enjoyed contests for more than 27 years and have always found the mainstream contests to be almost as good as a calendar and the conduct of participants generally very good, whether the contest be a hectic 24 hour world-wide spectrum contest or the more sedate QSO party. In these contests the participants do not feel they need to swat up on the rules every year as they seem to run for years without rule changes. This, I am sure, has much to do with their popularity, as has the stability of these major contests run throughout the year been essential to the orderly spread of contests during the year. The entrants look for the dates that entries close and for any changes first. They then look for any minor changes in the rules — in short, stability is the name of the contest-game and I do not intend to change any rule without a very good reason.

The RSGB Commonwealth Contest is a good example of stability, for more than 20 years I have enjoyed this annual event and cannot remember when the rules were last changed, and it is usually on in the first or second weekend in March. The same contestants can be heard each year and you sometimes wonder why so-and-so was missing last year, but, sure enough, he is heard again the following year. The results are always very interesting with the same stations appearing in the top few positions year after year.

Comments on the contest usually spell-out how the participants have enjoyed the contest and tried hard but. . .and hope to do better next year! More often than not, they do improve the total score by trying something new even though they know that they will never make a score that will place them in the top 10, for instance, because of the geographical location of the station location. This is healthy and shows that the entrants are, in the main, joining in the battle for the pure enjoyment of the sport.

However, it has saddened me to read, over the past couple of years, the comments of a few entrants from our country complaining about the contest not being fair because they say that Canadian stations have an unfair advantage because of their location in North America, and suggest some magic formula be applied to make it "fair." This may well be the case, but these contests are for our enjoyment and training. To change rules to suit everyone who complains long enough would make contests far too complicated for the average operator to enjoy.

The VHF contest scene can, in my opinion, be improved and simplified to some extent by the introduction of the Maidenhead Locator System. The fact that only 19 entries were presented to the FCM following a major VHF contest speaks for itself. I am certain that a few hundred stations spent some time working up a lather in a mad flurry of activity, but after the contest was over thought, "why take the trouble to enter the log." Perhaps, dear reader, if you had taken a few minutes to enter your log you would probably have a nice little sheepskin on the shack wall today. Enough said. . .

A group of us down here in deepest, darkest Tasmania are looking at ways to introduce the Maidenhead System of location blocks into the contest scene. This system is becoming very popular throughout Europe and America and will be used universally in due course. Because of the areas of the grids that may be used, contests where distances can play a role become easier to calculate and ways of making VHF contests more interesting to participate in become possible without making then too complicated to enter.

Some articles on the Maidenhead Locator System appear on page 28, *Amateur Radio* January 1985, page 35 August 1985 and in the NZART Call Books. (There is also a Maidenhead Pamphlet listing world-wide locations which is available from WIA Magpubs and some Divisional Bookshops).

EUROPEAN DX CONTEST — SSB Section

TIME — 1200 UTC, Saturday, September 12, to 2400 UTC, Sunday, September 13, 1987.
BANDS — 3.5, 7, 14, 21 and 28 MHz.
CLASSIFICATIONS —

a Single operator — all bands. All work including logs, etc, to be done by one.
b Single operator — high bands. As above, but operation on 14, 21 and 28 MHz.
c Multi-operator — single transmitter. Only one single transmitter on any band at one time is permitted.
d SWL.

REST PERIODS — Only 30 hours of operation out of the 36 hours are permitted for single operator stations. The six hours of non-operation may be taken in one, but not more than three periods at any time during the contest and have to be marked in the log.
EXCHANGE — A contest QSO can only be established between a non- European and a European station. Exchange the usual five or six digit serial number RS/T report, plus a progressive QSO number starting with 001. (See special regulations for RTTY).
POINTS — Each QSO counts as one point. A station may be worked only once per band. Each confirmed QTC, given or received, counts as one point.
MULTIPLIERS — Non-Europeans: the multiplier for non-European stations is determined by the number of countries worked on each band. (See European countries list).
SCORING — The final score is the total QSO points plus QTC points multiplied by the total multipliers from all bands.
QTC TRAFFIC — Additional point credit can be achieved by making use of the QTC traffic feature. QTC means reporting back the data of a QSO between a non-European and a European station earlier in the contest. It can be sent from a non-European to a European station. The basic contest QSO sense is that after a number of Europeans have been worked a list of these QSOs data c an be reported back during a QSO with another European station.

A QTC contains the time, call sign and QSO number of the station being reported (eg 1307/DA1AA/431. This means that you worked DA1AA at 1307 UTC and you received the serial number 431).

A QSO can be reported only once and not to the station contacted in the QSO.
Only a maximum of 10 QSOs to a station is permitted. You may work the same station several times to complete the 10 QTCs. Only the first contact, however, has QSO point value.

Keep a list of QTCs sent. QTC 3/7 means that this is the third series of QTCs sent and that seven QSOs are reported.

If more that 100 QTCs are claimed, a list of the calls from or to whom the QTCs were received or sent, is requested.
CONTEST AWARDS — Certificates will be awarded to the highest scorer in each classification in each country, reasonable score provided. Continental leaders will receive a plaque. Certificates will be awarded to stations with at least half the score of the continental leader.
DISQUALIFICATION — Violation of the rules of this contest or unsportsmanlike conduct, taking credit for excessive duplicate QSOs, any altering or forging of log entries in order to increase the actual score will be deemed sufficient cause for disqualification. The decision of the contest committee is final.
LOGS — It is requested to keep the log as it is in the DARC log sheets. Computer logs are accepted. All entrants are required to submit a list of stations worked for each band on which they made more than 200 QSOs. For each duplicate QSO removed from a log by the checker the penalty is crossing out three valid contacts. Any change of bands has to be marked in the log.

You may have WAEDC log and summary sheets by sending a large SAE and IRCs to the address below. Each log entry has to be sent with a summary.
SPECIAL REGULATIONS FOR SWLs — Participation is only possible in the single operator/all band classification. Any SWL may not be a member of a team participating in the transmitting category.
All call signs — Europe or non-Europe — may only be logged once per band. It is not necessary to hear both stations of a contest QSO, but the serial number sent by one station and both call signs have to appear in the log. Each contest QSO logged counts as one point. QTCs count one point each, if the sending and receiving station is logged for the first time. Multipliers count according to the European and the DXCC countries list.
SPECIAL REGULATIONS APPLY FOR RTTY — In the RTTY section of the WAEDC, all regulations are the same but to generate more activity in Europe and to raise the number of QSOs, points contacts between European stations are permitted. QTC traffic however, is only permitted between Europeans and non-Europeans and multiplier and multiplier regulations, are as above.
DEADLINE FOR LOG ENTRIES — CW — September 15. Phone — October 15. RTTY — December 15, 1987.
MAILING ADDRESS — WAEDC Contest Committee, PO Box 1328, D-8950 Kaufbeuren, Federal Republic of Germany.
EUROPEAN COUNTRIES LIST — C31, CT1, CU, EA, EA6, EI, F, G, GD, GI, GM, GM Shetland, GU, GW, HA, HB, HB0, HV, I, IS, IT, JW Bear, JW Spitsbergen, JX, LA, LX, LZ, OE, OH, OH0, OH0M Market Reef, OK, ON, OY, OZ, PA, SM, SP, SV, SV5 Rhodes, SV9 Crete, SV Athos, T7, TA European Part, TF, TK, UA1, 3, 4, 6, UA2/UZ2F, UA Franz Josef Land, UB, UC, UN/UK/UK1N/RA1N, UO, UP, UQ, UR, Y2, YO, YU, ZA, ZB2, 1A0, 3A, 4U1 Geneva, 4U1 Vienna, 9H1.

28TH SCANDINAVIAN ACTIVITY CONTEST

TIMES — CW on September 19-20. Phone September 26-27.
1500 UTC Saturday to 1800 UTC Sunday.
This contest is the world working Scandinavian stations. The same station may be worked on

each band for QSO and multiplier credit. The prefixes used in Scandinavia are:
LA, LB, LG, LJ (Norway), JW (Svalbard and Bear Island), JX (Jan Mayen), OF, OG, OH, OI (Finland), OH0 (Aland Island), OH0M (Market Reef), OX, OY, OZ, SJ, SK, SL, SM, TF.
BANDS — 3.5, 7, 14, 21, and 28 MHz according to IARU band plans. 3.560-3.600, 3.650-3.700, 14.060-14.125 MHz should be kept free of contest activity.
CLASSES — Single operator and multi-operator, single transmitter, all bands only. Multi-operator must remain on the same band for at least 10 minutes. Also, QRP operators (maximum of 10 watts output) and SWL (only SAC stations may be logged).
EXCHANGE — RS/T plus a QSO number starting with 001.
POINTS — European stations score one point for each SAC contact. Non-Europeans score one point on 14, 21 and 28 MHz.
MULTIPLIER — Each call area in the above list of SAC countries worked on each band (call areas, not prefixes).
FINAL SCORE — The sum of QSO points from all bands multiplied by the sum of the multipliers from each band. Scoring for SWLs is the same as above.
AWARDS — Certificates to the winning stations in each class, both CW and phone in each country and each USA call area. QRP stations will be listed in one common list. The non-SAC SWL winner will be awarded, plaques to the top scoring station in each continent. The usual disqualification criteria will be observed. Include a summary sheet and a dupe sheet for logs with more than 200 QSOs. Also a signed declaration.
DEADLINE — Mailing deadline is October 30.
ADDRESS — Send logs to: SRAL Contest Manager, Erikki J Korhonen OH4NRC/OH8RC, PO Box 44, SF 00441, Helsinki, Finland.

RSGB 21/28 MHz SSB CONTEST — Transmitting Section

PERIOD — 0700 to 1900 UTC, October 11, 1987.
SECTIONS —
a UK Single Operator
b UK Multi-operator, Multi-band
c Overseas Single Operator
d Overseas Multi-operator

FREQUENCIES — 21 and 28 MHz. Entrants are requested not to operate in the bands 21.400-21.450; 28.000-28.500 and 29.100-29.700 MHz.

EXCHANGE — RS report and serial number starting with 001.

SCORING FOR NON-UK STATIONS — Three points for each completed contact with a station in the British Isles. Multipliers are: G2, G3, G4, G5, G6, G8, G0, GD2, GD3, GD4, GD5, GD6, GD8, GD0, GI2, GI3, GI4, GI5, GI6, GI8, GI0, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GJ0, GM2, GM3, GM4, GM5, GM6, GM8, GM0, GU2, GU3, GU4, GU5, GU6, GU8, GU0, GW2, GW3, GW5, GW5, GW6, GW8, GW0. Contacts with GB stations will not count for points or multipliers. For all entrants, the total score will be the number of points on each band added together, multiplied by the total number of multipliers gained on each band. Unmarked duplicate contacts for which points have been claimed will be penalised at the rate of 10 times the claimed points. Entries with more than five unmarked duplicates are open to disqualification.

LOGS — Logs sheets to be headed date, time UTC, station worked, RS and serial number received, multiplier, points claimed. A summary sheet listing multipliers worked on each band must be included.

DECLARATION — With each entry there must be a declaration, signed and dated, that the station was operated within the rules and that the decision of the council of the RSGB shall be final.

ADDRESS FOR LOGS — All logs must be sent to RSGB Contest Committee, PO Box 73, Lichfield, Staffs, WS13 6UJ, England. These entries must be received by December 7, 1987.

AWARDS — Overseas stations will be awarded certificates for the leading three entrants overall and, at the discretion of the contest committee, to the leading station in each country.

RSGB 21/28 MHz SSB CONTEST — Receiving Section

SCORING — Overseas SWLs should log only British Isles stations in contact with overseas stations taking part in the contest. Scoring and multipliers as per the transmitting section.

LOGS — Logs to be headed date, time UTC, call sign of station heard, RS and serial number sent by station heard, call sign of station being worked, multiplier, points claimed. A summary sheet listing multiplier heard on each band must be included.

NOTE: In the column headed station being worked, the same call sign may only appear once in every three contacts logged except when the logged station is a new multiplier for the receiving station. Also, the station heard may only be logged once on each band for the purpose of scoring.

DECLARATION — Each log must be accompanied by the following declaration "I declare that this station was operated within the rules of the contest and I do not hold a transmitting licence for frequencies below 30 MHz."
AWARDS — As in transmitting section.

RSGB 21/28 MHz CW CONTEST — Transmitting Section

PERIOD — 0700 to 1900 UTC, Sunday October 18, 1987.
SECTIONS —
a UK Section
b QRP UK Stations using less than 10 watts input
c Overseas Section
d QRP Overseas Stations using less than 10 watts input
FREQUENCIES — 21 MHz only. Entrants are requested not to operate in the band 21.075-21.125 MHz.
EXCHANGE — RS/T report and serial number starting with 001.
All other details as in the SSB section.

ar

Australian Maritime College

Courses in Maritime Electronics and Radiocommunication

The Australian Maritime College offers Associate Diploma courses in Maritime Electronics and Marine Radiocommunication.

Both are two year, full-time courses. Successful graduates qualify for a wide range of positions in the public and private sector — on shore as engineering assistants, technical officers, design draftsmen and technicians; or at sea as radio officers.

Both diplomas are recognised by the Australian Public Service Board and the Australian Institute of Engineering Associates.

ENTRY REQUIREMENTS: HSC or equivalent level passes in mathematics, a science subject and preferably English. Mature age applicants with relevant experience will also be considered.

FEES: There are no course fees, other that the $250 p.a. government fee. The courses are approved under AUSTUDY.

FACILITIES: The College is fully equipped with the latest training facilities to provide students with the practical experience and technical knowledge required for their chosen career.

FOR FURTHER INFORMATION, CONTACT:

The Admissions Officer
Australian Maritime College
PO Box 986
LAUNCESTON, Tas. 7250

or telephone, toll free (008) 02 0377

Know your Second-hand Equipment

Ron Fisher VK3OM
3 Fairview Avenue, Glen Waverley, Vic. 3150

A Bit of this and a Bit of that!

This month, rather than devote the whole column to one manufacturer, I thought it might be a good opportunity to look at some of the equipment readers have requested to be reviewed.

However, before starting on them, a few words about older rigs in general may be appropriate. Firstly, *older* in this reference is to equipment over 15 years old. If you are working on a tight budget, many of these old rigs look to be an excellent way of getting on the air. And, indeed they can be, but it is necessary to check them out properly before parting with your hard-earned cash. Following is a list of things to do when trying out a new-found bargain.

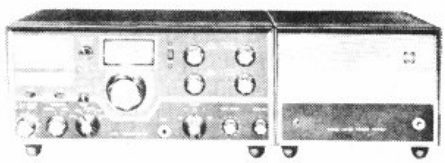
1 Stand back and take a good long look at it. Is the paint worn? Are there knobs or switches that don't look original? Have extra plugs or sockets been added to the rear panel? Is the original instruction book available? Have any modifications been noted in the book?

2 Turn the power on and check the receiver operation. Is the audio and RF gain control scratchy in operation? Are there loud clunks when switches are operated? Turn on the crystal calibrator and zero the VFO. Sit back for 10 minutes and check how much the unit has drifted — is it more than you can tolerate? Check the receiver's sensitivity, preferably by comparing it with another rig. If you cannot do this, does the receiver sound "alive" on, say, 10 metres?

3 Tune up the transmitter and check the power output on all bands with a power meter. Is is often a good idea to take your own power meter/dummy load. Well, how much power should you get? Even today, most transmitters are rated power input and not power output. You should, as a rule of thumb, get about half the power out on the lower bands and a little less on 15 and 10 metres when measured in the CW mode. Plug in the microphone and check that the power output is about the same with a steady whistle.

If the unit passes all of these tests, go ahead and buy it if the price is right.

Now, on to some typical old units — and one not so old!



THE SWAN 350 and 500 HF SSB TRANSCEIVERS

These American-made transceivers became available in 1964 and 1967, respectively. They were valve-type transceivers and covered the 80 to 10 metre bands. A separate AC or DC power supply was required and the photograph of the 500 shows the matching Swan AC Power Supply. The 350 used 6HF5 valves in the final and gave about 150 watts output, whilst the 500 used 6LQ6 valves which, while rated at higher power, gave about the same output as the 6HF5s. General performance for the time was quite good, however some of the problems were — poor AGC action with a lot of pumping on strong signals. There was also overload and distortion on strong signals, and quite an amount of warm-up drift which varied fro band to band due to band-switched VFO.

Price when new was about $600, including the AC power supply. Optional extras included the AC and DC power supplies. VOX was not built-in but was available as an option. Secondhand value today, taking into account everything said at the beginning of this column, would be about $200.

THE KW-2000 SERIES HF TRANSCEIVERS

Produced in England by KW Electronics, who manufactured a wide range of amateur equipment in the late 1950s and 60s, the KW-2000 transceivers were produced between 1964 and the mid-1970s. They were often referred to as English "Collins" equipment, although the only similarity was that they both used a 455 kHz mechanical SSB filter. The four models were:

— the 2000 with one 6146 final and about 50 watts output

— the 2000A with two 6146s and 100 watts output

(Both of these units only covered 200 kHz in each tuning range (again like Collins) and had a very poor string driven dial with extremely close spaced calibration marks).

— the 2000B featured a much improved dial drive with two speed tuning while

— the 2000E changed to 500 kHz coverage for each range.

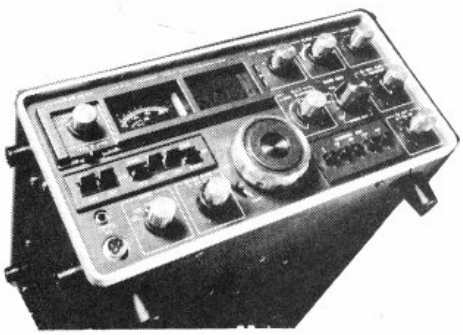
Problems apart from the early series dial drive were:

— poor sensitivity on 15 and 10 metres

— VFO drift which seemed to be worse on the later E-model than on the earlier ones.

Later dial drives were subject to wear and often became very sloppy. KW products over this period were handled by three different distributors in Australia, but overall not many were sold.

The KW Company is still "alive and well" in the UK but these days it imports and sells Ten-Tec equipment. However, they still stock many spares for the old KW transceivers. Price when new was about $600 with AC power supply. Secondhand value today would be about $225.



THE UNIDEN 2020 HF TRANSCEIVER

This was the one and only HF amateur transceiver produced by the Japanese Uniden Company. First sold in Australia in mid-1975, the 2020 was reviewed in the May 1976 issue of AR. It was a solid-state unit with valve driver and final transceiver that covered 80 to 10 metres in 500 kHz bands. However, there were several unusual features. The 500 kHz bands were actually tuned in five 100 kHz segments, each of which was selected by five push-buttons to the right of the tuning-knob.

The frequency readout was part digital and part analogue, but with the analogue part made to look digital. Opinion on the frequency selection and readout is divided; you either love it or hate it. The 2020 featured a built-in AC and 12 volt DC power supply, two speed RIT and an excellent noise blanker. General performance was very good on SSB and a built-in CW filter provided good selectivity in this mode.

Price new was $550, secondhand value today would be about $350. An external VFO and matching speaker were offered as options. As the Uniden Company went out of amateur equipment after producing the 2020, some spare parts are nearly impossible to obtain.

ar

LOGGING CALL SIGNS

Don Law VK2AIL
RMB 626, Adelong Road, Tumblong, NSW. 2729

A computer program for logging call signs and details for the VZ300.

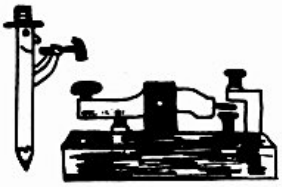
```
  5 REM "STATION LOG"
 10 CLS
 20 INPUT X $
 30 RESTORE
100 DATA VK2AIL, DON TUMBLONG 80
    1130 7.10.86 FLIES KITES
  ↓
  ↓
  ↓
  ↓ Depending on RAM size
9000 READ A$, B$
9010 IF X$ < > A$ THEN 9000
9020 PRINT B$
9030 GOTO 20
```

Type RUN call sign RETURN.
If not listed you get OUT OF DATA error.
Type LIST.
Enter call sign using next line number.
(You may use two lines of data) ie NAME, QTH, BAND, TIME, DATE, REMARKS.
(Dump on tape after each session).
Use two tapes alternately for safety.

ar

Thought for the Month

Progress is like a wheelbarrow — if you don't keep pushing it stops.

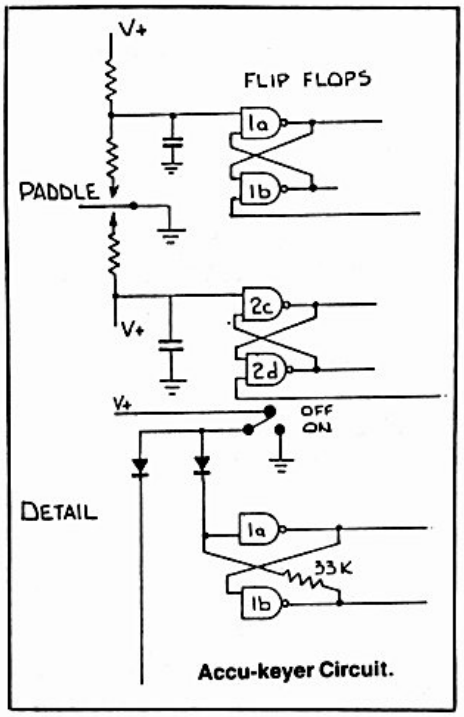


Pounding Brass

Gilbert Griffith VK3CQ
7 Church Street, Bright, Vic. 3741

I goofed. Apologies.

Referring back to May AR, I gave some circuit modifications for the Accu- keyer. It seems a few people have been in bother because the circuit quoted in AR of February is different to the circuit I was referring to, which is the original as published in EA 1978. Anyway, any amateur worth their salt will be experimenting, and should know the basics of the circuit, especially if they have built one. Don't be afraid to change values here and there to see what happens.



Accu-keyer Circuit.

Passing on circuits modifications is a dodgy business at best, how many antenna designs have you tried that didn't work?

I have been busy with a number of things, among them is digital circuits. I have a modification for the Accu-keyer — a weight control, but I have not tried it yet because I don't understand how it works! Also, I gave my keyer away and must convince the new owner to try it.

I have written to the USA for prices on Curtis chips and sent them an order on spec, so I am keeping a list of those who want them and will let you know.

Please help when writing to me by enclosing an SSAE for a reply. Otherwise it will take six weeks for a reply through the column.

I haven't been on air very much lately, but I did have a QSO with Colin VK3DEG, and he sent me some information on the Early Bird Net. You can look for them on 3.547 MHz at 2100 UTC. The control station is Eric VK3EDS, and Jack VK3CJT, on Saturday. Transmitting stations are Harvey VK3AHU, Laury VK3CLV, and Colin VK3DEG. The session consists of Morse/Readback/Morse/Readback from 2100 to 2145 UTC approximately. The practice is at 10 WPM (12 WPM character speed ITU), and Colin finished his stint with a faster passage at 12 WPM-plus. All material is DOC type text with no punctuation. Similar to the examinations!

In addition to receiving practice, they also offer sending practice and critique, with one to one tuition if required, by mutual agreement.

They also offer an award. A good achievement award requires 20 participations in the net, the passing of a DOC type 10 WPM test in sending and receiving. There is more! An award for SWLs who have to collect 40 five character groups which are sent at the rate of two each morning.

Each Wednesday, net graduates are asked to control proceedings, this gives them an opportunity to access progress and capabilities.

Because of the demand, Colin also runs a net at 0815 EST on 3.534 MHz, Mondays-Fridays. Look for him, VK3DEG or Jeff VK3BZZ.

Colin, who says he is about 70 years, learned Morse whilst in the RN during 1940. He has had an interest in Morse ever since, and, as you can see, he is one of the few who give their time helping newcomers in getting started. Many thanks Colin.

Don't forget to have a listen to 144.950 MHz on your hand-held if you require a bit of receiving practice. This is a Melbourne service but check your Division to see what they have in your city.

DX WITH A DIT

Dan O'Brien W6PB, had a marvellous sense of humour, and he was a pure genius at practical jokes. Dan used to play a trick on Bud Bane W6WB, every so often. It seems that once in a while Bud would call some rare DX somewhere and Dan would try to put a DIT right after the "W" in "WB", making it sound like "PB".

It worked sometimes, and the station W6WB was frantically calling would come back to W6PB, when all Dan sent was one DIT! When Bud found out about what was happening he left less space in between the "W" and the "B", and to this day he seems to rush his call, leaving a minimum space between the W and B.

(Rich Lawton N6GG, looking back to the early club days in the 40th Anniversary issue of the "the DXer", monthly bulletin of the Northern Californian DX Club, October 1986).

from *Morsum Magnificat*

A SPARKER'S "IF"

If you can keep your head when all the buntings
Are losing their heads and blaming it on you;
If you can read through atmospheric crashes
With signals fading down to near "R2";

If you can send and not get tired sending

And when you stumble, make a neat erase;
If you can read without the old complaining;
"His Morse is just a damn disgrace";

If you don't fill the unforgiving minute
With sixty seconds worth of IMIs
And if you always use correct procedure,
But still don't talk too much, nor look to wise;

If you can live with buntings, jeeps and stokers
And tolerate both Pusser's rum and stew;
And copy when reliefs are in their hammocks
And never miss a group with every spew;

If officers and chiefs and drunken Yeomen
Can heckle you and still your nerves won't fray;
Then you're a damn good sparker son — you've made it!
You're earning every penny of your pay. . .

MUL.

CUL es 73 es 88, Gil VK3CQ.

ar

MORSEWORD 6

***Compiled by* Audrey Ryan**
30 Starling Street, Montmorency, Vic. 3094

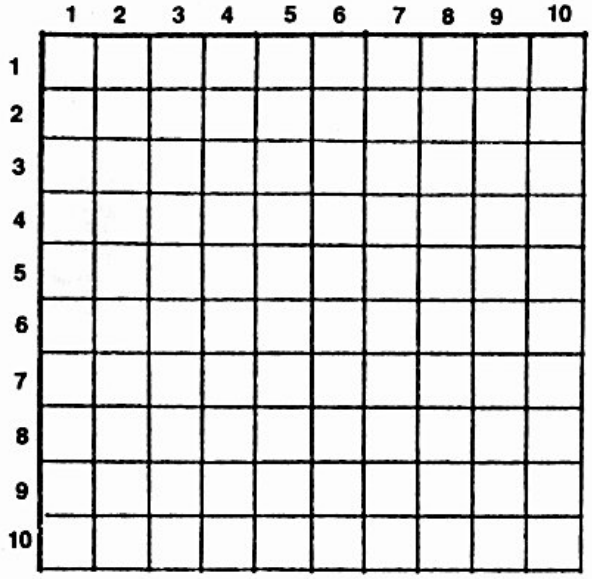
ACROSS

1. Take flight
2. Snowy rain
3. $10
4. Certain
5. Affectedly Artistic
6. '. . . . upon a time'
7. Nudge
8. Monster
9. Parson's house
10. '. . . . and that'

DOWN

1. 'To and . . .'
2. Family dwelling
3. To enclose
4. Pig
5. A breed of dog
6. Spots
7. Gippsland city
8. Platform
9. Printing fluids
10. Needle cases

© Audrey Ryan 1987



Solution page 63

Australian Ladies Amateur Radio Association

Joy Collis VK2EBX
PUBLICITY OFFICER, ALARA
Box 22, Yeoval, NSW. 2868

Women become involved with amateur radio for many different reasons: for some it is a case of "if I can't beat them, join them," others find it a means of overcoming loneliness, and sometimes it is a way of coping with boredom caused by injury or incapacity.

One thing they all have in common is a determination to obtain that licence, and get started on what is generally agreed to be a satisfying and rewarding hobby, which cuts across the barriers of age and social status. One comment often heard is "I have made so many friends!" What more can one ask of a hobby?

This is how Margaret VK4AOE, discovered amateur radio:

HOW I BECAME INVOLVED IN AMATEUR RADIO

My introduction to amateur radio was many years ago when my brother, Harry VK4LE, "got on air." Hours of sleep were forfeited on many nights as I listened to the interesting goings-on in Harry's shack. (The spiders approved of his open wire feedline too). Then Harry moved, and I acquired an OM and four offspring.

End of story, I thought.

However, about a decade ago a specialist informed me that I would lose all useful sight in one eye and there was a fair chance the same may happen to the second eye. So there was a need for another pastime to replace needlework which I have always enjoyed doing.

The big hunt started for a way to gain the necessary knowledge — what did I have to learn, where did I get the books or whatever I needed from — the questions I asked myself were endless. The frustrations from unanswered letters (they may have been lost in the post), only made me more determined. Perseverance paid off and I acquired a small stack of study material.

Then a novice course conducted by Claud VK4UX, made things much easier and VK4VCE came on air in January 1980, followed by VK4AOE, two years later.

The fact that I was educated by the Queensland Primary Correspondence School, with my mother as Home Supervisor, and I didn't go on to high school did not deter me. It just meant that I had to work harder. The name of the game is "Determination to Succeed."

Incidentally, a change of doctor and a small operation later, plus one contact lens, I still have one good eye and the other partly useful. The big plus is many new friends and a great hobby.

ALARA COMMITTEE

At the Annual General Meeting held on August 24, the following Committee was elected:

Marilyn Syme VK3DMS	President
Jennifer Warrington VK5ANW	Secretary/Vice-President
Val Rickaby VK4VR	Treasurer/Souvenir Custodian
Margaret Schwerin VK4AOE	Vice-President
Helene Dowd VK7HD	Past-President
Mavis Stafford VK3KS	Awards Custodian/Historian
Marlene Perry VK2KFQ	Contest Manager
Meg Box VK5AOV	Minute Secretary
Joy Collis VK2EBX	Publicity Officer
Gwen Tilson VK3DYL	Sponsorship Secretary
Kim Wilson VK3CYL	Librarian
Bron Brown VK3DYF	Editor/VK3 State Representative
Bev Hebiton VK6DE	VK6 State Representative

At the time of writing there is no confirmation of the VK2, 4, 5 or 7 State Representatives.

There are a few changes: Kim VK3CYL, replaces Bev VK6DE, as Librarian. Poppy VK6DE, has handed the VK6 State Representative's respectively.

ALARA-MEET

The second ALARA Get-Together, in Adelaide, is now only a few weeks away, and we are looking forward to meeting each other and participating in the interesting program arranged by the VK5 members. We are all hoping the weather will be kind to us, but plan to enjoy yourselves even if it proves the reverse.

ALARA CONTEST — November 7, 1987

The gremlins have been very active regarding the 1987 ALARA COntest, which will be held on Saturday, November 7, from 0001-2359 UTC.

The contest was incorrectly reported as October 14 (July AR) and November 14 (ARA, Vol 10 Issue 2). There was a further error in the ARA announcement which stated "ALARA members send RS/T, member number, name and serial." ALARA members do not have member numbers. Exchanges are: RS/T, serial number beginning at 001, name and ALARA member.

Non-member YLs (and OMs) — RS/T, serial number beginning at 001 and name.

Hopefully this will clear up any confusion.

We are anticipating an even bigger and better contest this year, and are hoping that many of our DX members will be able to participate. We also hope to have the OM support we have enjoyed in recent years.

Last year we had a winner for the Florence McKenzie Trophy — Bobbie VK2PXS, and hopefully this year will see the novice YLs again competing for this beautiful award.

The Florence McKenzie Trophy is now permanently displayed in a special glass case in the WIA Victorian Divisional Rooms. Our thanks to the VK3 Division.

Mavis VK3KS, is willing to assist anyone wishing to brush up on their CW. She has a CW sched on 80 metres on Monday nights after the ALARA Net.

ALARA AWARD

Alan Viegas VK8AV, received Award No 128 on May 2, 1987.

The first ALARA Award was issued on March 13, 1980, to G4EZI, with No 2 being issued to Austine VK3YL, endorsed "First VK." Freda VK2SU, gained the "First All CW" endorsement. Elizabeth VE7YL, has four awards with her different call signs: YB0ADT, VE7BIP, PJ2CC, and GU4LMW/A.

As the number of ALARA members has grown, the award has become easier to achieve, and is certainly worth the effort required.

Cost of the Award is $A3 or seven IRCs, and the Award Custodian, Mavis VK3KS, is willing to accept Australian 50 cent stamps in lieu of the odd- dollar.

YL ACTIVITIES

Congratulation to Jenny VK5ANW, who has been re-appointed to the position of VK5 Divisional President. Congratulations are also due to Mavis VK3KS, winner of the VK-YL section of the 25th Anniversary WARO Contest. Mavis received a beautiful silver coaster for her achievement.

Grace VK7NNN, is a regular check-in on the Tasmanian Devil Net each Tuesday on 80 metres. Rae VK9NXY, is active from Christmas Island. Bev VK6DE, has been on a four-wheel-drive trip "up north." Look forward to hearing all about it Bev. Akiyo JH1GMZ, has visited many countries including the USA, China, Korea and Thailand. She has not yet been to Australia, but is hoping to get here one day.

YL CONTESTS

16th JLRS Party Contest

Phone: From Saturday September 26, 1987 at 0300 UTC to Sunday September 27, 1987 at 0300 UTC.
CW: From Saturday October 3, 1987 at 0300 UTC to Sunday October 4, 1987 at 0300 UTC.
Operation: All bands and all modes may be used in accordance with operator and station licenses. Crossband operation is not permitted.
Scoring: Phone and CW will be scored as separate contests, submit separate logs for each contest.
Logs: Signed by the operator must be postmarked not later than October 20, 1987.
Send logs to the Contest Custodian, Chizue Yamada JA1EYL, 5-28-4 Nakano, Nakano-ku, Tokyo 164, Japan.
Suggested Frequencies:
PHONE: 14.160, 14.280, 21.280, 28.600 MHz.
CW: 14.060, 21.060, 28.060 MHz.

Howdy Days — Sponsored by YLRL

To be held from Wednesday, September 9, at 1400 UTC to Friday September 11, 1987, 0200 UTC.
Operation: All bands and modes may be used, no crossband operation. Operating breaks must be indicated in log. Logs must be received by October 7, 1987.

YL Anniversary Party

CW: Wednesday, October 14, 1987 at 1400 UTC to Friday, October 16, 1987 at 0200 UTC.
SSB: Wednesday, October 28, 1987 at 1400 UTC to Friday, October 30, 1987 at 0200 UTC.
Logs: Must be postmarked by November 14, 1987 and be received by December 12, 1987.
Logs for the two YLRL contests should be forwarded to Mary Lou Brown NM7N, 504 Channel View Drive, Anacortes, WA98221, USA.
Further information on all contest can be obtained from Bron Brown VK3DYF. Please include SAE with your request.

NEW MEMBERS

Warmest greetings to new members:
Kathy VK3XBA, Jean KA7SWH, Gaby DL2BCH, Rae VK9NXY (Christmas Island), Bonnie Pounsett (wife of VK4QY), Cathi KA1OKF, and Hazel VK4MAZ.

Hazel VK4MAX, regularly drove her teenage son to Oakey for novice classes, and decided she might as well study too. The result, a new call sign on the air. Congratulations Hazel.

Ann VK4ANN.

CHANGE OF CALL SIGN

Congratulations to Anne ex-VK4KZX, now VK4ANN. A very appropriate call sign.

Jan VK3DMH, changed not only her call sign, but also her name (see March AR). Jan is now VK3HD.

See you all again next month.

73/33, Joy VK2EBX.
ar

Radio Amateur Old Timers Club

Kevin Duff VK3CV
PUBLICITY OFFICER
Radio Amateurs Old Timers Club

HISTORY OF THE RAOTC

Back in 1974 it was suggested to Bob Cunningham VK3ML, during a QSO over the air, that there should be some sort of Old Timers' Club in Australia which would permit amateurs who had talked to one another for many years, to unite in a common cause for the continuation of the friendships that had made on the air over so many years.

Bob Cunningham took the initiative and talked about the idea with many amateurs on and off the air. The result was one of great enthusiasm amongst all those contacted for an early move to form the Old Timers' Club.

The first move was to present the idea at a suitable function where various ideas could be discussed. Thus the first dinner was held on February 5, 1974, at the Sciences Club, Clunies Ross House, Royal Parade, Melbourne. It was also the venue for meetings of the IREE Headquarters and was therefore an appropriate place for meetings. Bob Cunningham chaired this first meeting with the able assistance of the late Ivor Morgan VK3DH, who later became inaugural secretary. The original qualification for membership was that an applicant had been licenced for a period of 40 years. However, after all those present had voiced their comments, this qualification was reduced to 25 years. The outcome of the discussions on that memorable evening resulted in the formation of a constitution upon which to base the proposed Old Timers' Club.

At the inaugural dinner, we were fortunate in having, amongst our guest, Alan Butement VK3AD, and the late Max Howden VK3BQ. In the very early years of amateur radio, Alan was G6TM, and made history by establishing contact with Australian and New Zealand amateurs, in addition to amateurs in many other parts of the world. He spoke of those early days and the "Address-in- Reply" was given by the late Max Howden, the first Australian amateur to make two-way contact between Australia and the USA and the UK by both telegraphy and telephony. There were 38 amateurs at that dinner and they formed the nucleus of the present Radio Amateur Old Timers' Club of Australia.

During the following year, a draft constitution was drawn up and a suggested committee arranged, composed of Bob Cunningham VK3ML, President; Ivor Morgan VK3DH, Secretary; Ray Jones (SK) VK3RJ; John Tutton VK3ZC, Alan Butement VK3AD; Les Gough VK3ZH (SK); Max Hull VK3ZS; Stan Dixon VK3TE; and Harry Cliff VK3HC Treasurer. During that year, Bob Cunningham visited New Zealand and met with Casey Harris about the functions of the ZL club. Casey was then Secretary of the OTCZL. The RAOTC Australia was later to become affiliated with both the OTCZL and the RAOTA of the United Kingdom under the Presidency of G2UV. At the 1975 Annual Dinner the constitution was adopted and the aforementioned committee appointed.

At first, it might have appeared that the RAOTC was a Victorian affair but it was soon to become recognised as being international with a large application for membership from all States and from many overseas amateurs in the UK, USA, Germany, South Africa, New Zealand, Sweden and other countries — the overseas applicants are still steadily growing.

Until 1984, the Club circulated a newsletter to its members twice every year. This was replaced in 1985 by *OTN* the journal of the Radio Amateur Old Timers' Club of Australia, which is published and circulated annually, finances permitting.

About 800 copies of the journal are printed and, with the cost of stamps, envelopes, etc, included, this comes to a large sum. If members could donate something, no matter how small, to help pay the cost of our journal, this would be greatly appreciated. Donations can be forwarded to: The Secretary, RAOTC, Harold Hepburn, 4 Elizabeth Street, East Brighton, Vic. 3187.

The enthusiasm of Old Timers in joining this club has been most gratifying to its founder and committee members — past and present. Its continutation is greatly subject to younger Old Timers offering their services in an administrative capacity as the old Old Timers necessarily have to retire. We look forward to an expanding membership and the assistance of capable members to keep the RAOTC functioning on into the 1990s.

VICTORIAN MEMBERS LUNCHEON

The Annual Victorian Luncheon of the RAOTC will be held on Wednesday, September 23, at the usual venue, the City and Overseas Club of Melbourne, 291 Dandenong Road, Windsor. Members should arrive about 12.30 pm for lunch at 1 pm. An application form will be forwarded to Victorian members but all members are very welcome to this get-together.

New Club members are always welcome and membership accorded to radio amateurs who have been qualified to hold an amateur licence for 25 years. If you would like to join, send a SASE to Harold Hepburn, 4 Elizabeth Street, East Brighton, Vic. 3187, for an application form.

FEEDBACK

Feedback from amateurs suggests that the articles taken from the 1915 editions of *Wireless World*, and published in the June 1987 Radio Amateurs Old Timers' page, were enjoyed. Some more of these pieces are included this month.

AN AUSTRALIAN INCIDENT

Hospitality Repaid by Treachery

In our last number we devoted considerable space and prominence to emphasising the necessity for wireless amateurs placing themselves unreservedly in the hands of the British authorities with regard to their apparatus. We trust that our appeal, grounded on patriotism as well as self-interest, will have been effective. Our attention has recently been called to a paragraph in this connection which was cabled over from Australia. At Melbourne, as recently as an early date in March, the military authorities seized a wireless plant at the residence of an employee of the Western Electric Company named Bleeck. The man was of German parentage, in constant touch with his relatives in the Fatherland, to which country he was in the habit of paying frequent visits. The fact that this discovery only occurred eight months after the war had been in operation points to the necessity for continuous and unceasing vigilance.

ROYAL NAVAL DIVISION

Public School Battalion

The Admiralty have given official permission for raising a Battalion of 1 000 men, which will be strictly limited to Public School or University Men and who will serve together as a Unit.

Training is now going forward.

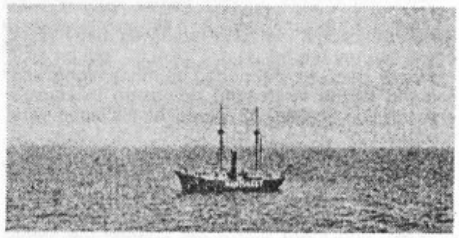
Applicants desiring to enroll should apply at once to

ROYAL NAVAL DIVISION
6, 7, 8 Old Bond Street,
London, W.
Telephone . . . Regent 5515.
GOD SAVE THE KING

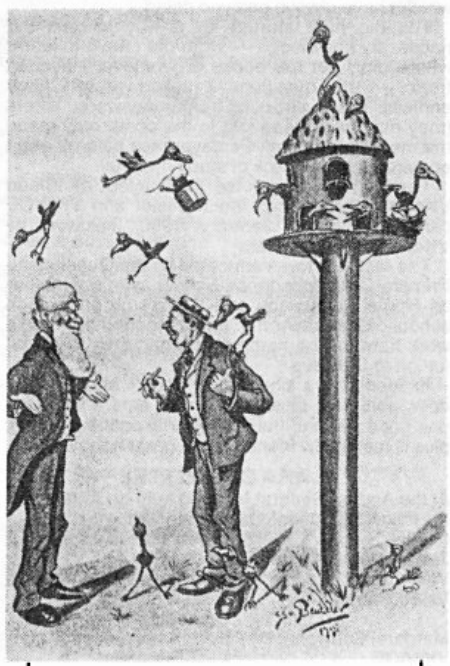
A SOLITARY OUTPOST

A Visit to a Nantucket Lightship

The island of Nantucket forms the eastern-most of a group of islands lying off the south-east coast of Massachusetts, and is one of the danger spots of the Atlantic seaboard of the United States of America. On the north shore is situated Nantucket town, possessing a nearly land-locked harbour and a population of about 3 000 inhabitants. In times past it formed the seat of an important whaling industry, but its claims to fame now rest almost solely on its attractions as a summer resort for the workers of the large cities on the neighbouring main lines. The trend of the coast lends itself admirably to the formation of shoals which constitute a dangerous menace to the mariner. To minimise this danger as far as possible the Commissioners of Navigation of the United States have established a light vessel, of which we are able to reproduce a photograph. We are extremely fortunate in having obtained this as fog surrounds the little ship for the greater part of each year. It possesses an electric lantern containing a light which occults every 15 seconds, and situated on the foremast. It is a steam lightship, and is anchored in 20 fathoms of water, having been placed there is 1909. The height of the lantern above sea level is 50 feet, and the light is visible for 13 miles. We are indebted to Mr W Condon for the photograph.



Nantucket Lightship.



"Those are my ohming pigeons."

A SUGGESTED SUBSTITUTE FOR A "BUZZER"

A recent number of the *English Mechanic* contains a rather amusing letter, referring to the Postmaster-General's notice concerning wireless apparatus. Mr Howard J Duncan, who writes the letter, states that it "may interest some of our wireless amateurs to know that a fair substitute for a 'buzzer' may be made by slipping the point of a dinner knife under a dinner plate till it reaches near the centre, and then operating the handle of the knife in the same manner as a Morse key. In this way it is possible to practice Morse without offending the Postmaster- General or infringing the Defence of the Realm Act." We note that Mr Duncan does not consider this quite equal to the

regular "buzzer" and only recommends it as a "stop-gap."

MISCONCEPTION OF WIRELESS POSSIBILITIES

Mr Charles R Gibson has been contributing long articles recently to the *Glasgow Herald* on the present use of wireless by the belligerents, and in the course of one of them tells an amusing story which , according to the writer, was repeated to him with portentous seriousness as an incident of the greatest gravity which had recently come under the narrator's personal observation:

"Two German workmen had been arrested as spies, and there had been discovered, hidden beneath the hearthstone of the kitchen on their two- roomed tenement house, a complete wireless installation capable of transmitting messages to Berlin."

Mr Gibson comments that it is possible to send wireless messages as far as from here to Berlin, but not with apparatus that can be stowed away beneath a kitchen hearthstone, or even contained in a large room.

FROM the Antipodes through the medium of the public press — in this instance the *Sydney Sun* — comes news of an invention which (if only it were true) would revolutionise the face of the earth. Under the heading of "Bullroarers versus Ultra-Violet Rays" our contemporary contrasts the methods of old time rainmakers with that of the oldest modern exponent of the art: "The rain-maker in our modern invention does not need to wear a head-dress of feathers and paint false ribs on his body with pipeclay; nor does he need a cannon or a cauldron like later members of the profession. All he does is sit in front of a switchboard, ascertain by 'phone or wireless where the rain is wanted and how much, push in a few plugs and touch some buttons. Then it's time for the populance to rush for the shops where they sell umbrellas for 2s 11d."

Rain in Australia by wireless! If only it were true.

RAPID WIRELESS SERVICE

On the last trip of the Cunard steamer *Franconia*, when the boat was 60 miles off New York, a passenger sent a Marconi-gram via the Western Union to San Diego, Cal, prepaying the reply. The message was sent through the Marconi station at Sea Gate and, to the astonishment of the passenger, the reply was delivered to him in 55-minutes. This is probably a record-breaker on sending a wireless message from a ship at sea across the continent and delivering a reply on board ship.

ACCUMULATORS

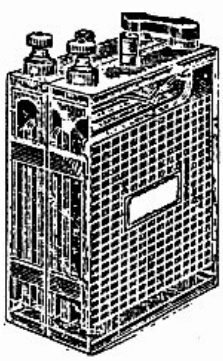
Made throughout at our SE London Works

GUARANTEED 2 YEARS

—

POST

4 Volt 10 Amp 8/- . . . 5d
4 Volt 20 Amp 10/- . . . 7d
4 Volt 40 Amp 13/- . . . 9d
4 Volt 60 Amp 17/6 . . . 10d
4 Volt 80 Amp 22/6 . . . free
4 Volt 100 Amp 27/6 . . . free



F L MITCHELL & Co, Limited
188 Rye Lane, Peckham, SE

Write for our General Catalogue of everything Electrical. Post free on receipt of 1d stamp.

A VARIABLE CONDENSER

Mr N J de Waard suggests the following method for making a variable condenser:

Take two test tubes such as are used by chemists, one fitting easily into the other, and both being filled with water. Spirals of copper wire reaching to the botttoms should be placed in each tube, that in the latter being of such diameter as to allow a smaller tube to slide up and down it. According to Mr de Waard, mercury does not give better results than water.

TECHNICAL MAILBOX

TS-820S FAULTY READOUT

This problem has shown up in number of TS-820S transceivers and in each case a clean up of the connectors has restored the operation of the readout to normal (at least for some months).

To clean the connectors:

Turn off mains power to the transceiver and remove the top and bottom covers of the TS-820S as per details on page 33 of the Instruction Manual.

Remove the eight top cover screws and the nine bottom cover screws. Unplug the speaker lead and lift away the covers.

Locate the Counter Assembly Unit (X60-1020-00) shown on page 42 of the Instruction Manual. Disconnect the cable connectors from the top and bottom of the Counter Assembly Unit.

Remove the four screws from the lower side of the transceiver holding the Counter Assembly Unit to the chassis. The unit can now be removed from the chassis.

Remove the four screws holding the shielded Counter Assembly Unit Box together. Then remove the four screws that hold the two PCBs in place. Each PCB can now be separated from the centre shielded piece. All connectors can be cleaned and sprayed with one of the contact type pressure-pack sprays.

After assembly (in reverse order to the above), the readout should be working again. At least until the next time it needs a maintenance 'clean up.'

—Contributed by Les Brennan VK4XJ

(Thanks Les for your handy hint. Other readers must know a handy hint regarding their equipment. Please write it up and share it with other amateurs in Technical Mailbox.) **ar**

Education Notes

Brenda Edmonds VK3KT
FEDERAL EDUCATION OFFICER
PO Box 883, Frankston, Vic. 3199

During a recent few days in Canberra I had extensive discussions with DOC officials about a number of matters related to education and examinations. These discussions have been fully reported to the Executive, but it is probably appropriate to publish some comment here for the benefit of members. Firstly, I would like to express my appreciation of the assistance and co-operation extended to me by the DOC officials, and the time they gave me. It made the visits most productive.

One of the outcomes is that the proposed Study Guide, to accompany the novice syllabus, is now almost finished. We went through it in detail and negotiated over any differences of opinion. Some minor amendments have now been made, and the final draft sent back for the "Seal of Approval", after which we can produce and distribute it.

I am sure it will be a most useful document for both students and teachers. There will, of course, always be some disagreements, but I think we have succeeded in restricting the potential questions to a reasonable level. My sincere thanks go to all those who have assisted in its production thus far.

The preparation of a similar guide to accompany the AOCP/AOLCP syllabus was also discussed, and work had started on this. I would be pleased to hear from any members who would like to assist with this project by reading and criticising drafts as they are produced. Comments from those who are teaching or have taught AOCP classes would be most welcome.

I have had several requests lately for sample regulations examination papers, which I have been loathe to supply because those produced in 1982 are a little outdated and I have not had time to write new ones. So, I asked for a sample paper to be released for circulation.

However, as changes to the regulations have restricted the number of possible questions and, as the new leaflets on regulations and operational procedures are soon to be released, it was felt that release of actual question was inappropriate. Instead, the Department will edit my collection of papers to remove questions which no longer apply. This should leave us with, I hope, about two approved sample papers.

I spent several hours inspecting examination papers, at both levels but concentrating on the novice papers, for standard of questions and overall balance. I did not record criticism in detail, but on average there were about two or three questions per paper where I objected to either the wording, the content or the standard of the question.

Admittedly, I did not read all the papers that have been used, but it is obvious from what I did inspect that the question bank is limited and questions are being recycled.

Taking a paper that was used in August and November 1986 as the standard, I compared questions on the earliest papers and some from the middle years with it.

Of the 50 questions on the 1986 paper, seven appeared in identical form on at least one of the first three papers, 17 had been modified only slightly without altering the sense or difficulty and a further seven were reworded versions or variations of the earlier questions.

It does not seem to me that the standard of the questions has risen significantly.

What may have given rise to the idea that the novice examination standard is rising is the fact that the questions distribution on the early papers was different — the first paper had 18 questions and the second 14 questions from Section 1 of the syllabus (Electrical Laws and Circuits), whereas the later papers have used the formula given in the syllabus; ie eight questions from Section 1.

It is worth noting that I do not recall any complaints about the published table of distribution of questions.

It is also significant that, for the last four examinations for which figures are available, the pass rates have been over 50 percent.

Discussions on other topics will be reported later.

73, Brenda VK3KT

ar

Electro-Magnetic Compatibility Report

Hans Ruckert VK2AOU
EMC REPORTER
25 Berrille Road, Beverly Hills, NSW. 2209

Are we alone?

For many years we seemed to suffer more than other community groups from lack of EMC. This is no longer so. The usefulness of amateur radio depends on maximum receiver sensitivity, as possible at the prevailing "state-of-the-art," which makes it harder to work in a polluted propagation medium. We have warned the industry, and also the frequency spectrum administration authorities, of the ever increasing number of EMC collision problems, as we go from the electrical to the electronic age. We have not only air and water pollution and deforestation, but also pollution of the frequency spectrum.

Earlier EMC Reports dealt with the problems faced mainly by radio amateurs, but we are no longer alone. Some measures (often only partly effective) have been undertaken by standards commissions and appliance manufacturers, to reduce the RFI from electrical appliances (mainly sparking motors and power lines). Unwanted radiation from television and broadcast receivers has also been dealt with, but the steps taken are often not good enough if the wanted signal is of low field-strength.

EMC and RFI problems became extremely serious at rocket ranges in the USA, where it was feared that signals from hand-held or mobile transmitters could affect rocket operation and testing on the ground. Soon firms appeared which specialised in checking and cleaning up the unwanted radiation from the many communication services. We have now the 'Interference Control Technologies, Inc' (USA), which conducts courses in German, French, Swedish and English and other languages where required. There are offers of EMC software, EMC technology magazines, EMC at EXPO 1986. EMC courses are being held in London, Paris, Munich, Amsterdam, Melbourne, New Zealand, Stockholm, Goteborg. There is no doubt that very soon the EMC engineer of any company dealing with electrical and electronic devices (there will soon be no others!) will hold a very important position. His knowledge and investigation will decide whether a product complies with the necessary EMC standards and is thus acceptable to the public. It is hoped that soon technical colleges and universities will offer courses in EMC.

DOC will need a substantial upgrading of facilities for mobile and laboratory testing. Radio amateurs are often especially equipped to work in this field. Many VK radio amateurs are radio inspectors. In West Germany the Radio Amateur Club of the Post Office is affiliated with the DARC. Other radio amateurs are with the Ministry of Science and Technology, because their private experience adds to their professional training.

It was reported earlier, that in West Germany the Engineers Association, the Standards Committee and the Electronic/Electric Industry (manufacturers and importers) worked out EMC standards during 10-15 years of discussions, testing and developing of measuring methods. The results of this work have been submitted to the ITU for the benefit of those countries which cannot afford to do the job all over again, or to help those who do not have the technology and know-how at this stage. DOC in VK has this information too. In West Germany one finds radio amateurs at all levels of the committees and organisations dealing with EMC.

EMC Symposium in Europe

Every year there is an EMC Symposium in Europe, including Eastern Europe. (The "Iron curtain" does not stop RFI and EMC problems!). In even-numbered years the meetings take place at the technical university of Zurich (Switzerland) and during odd numbered years the meetings are held at Wroclaw (Poland), a city known as Breslav for 600 years prior to 1945. These conferences are attended by specialists of the following organisations:

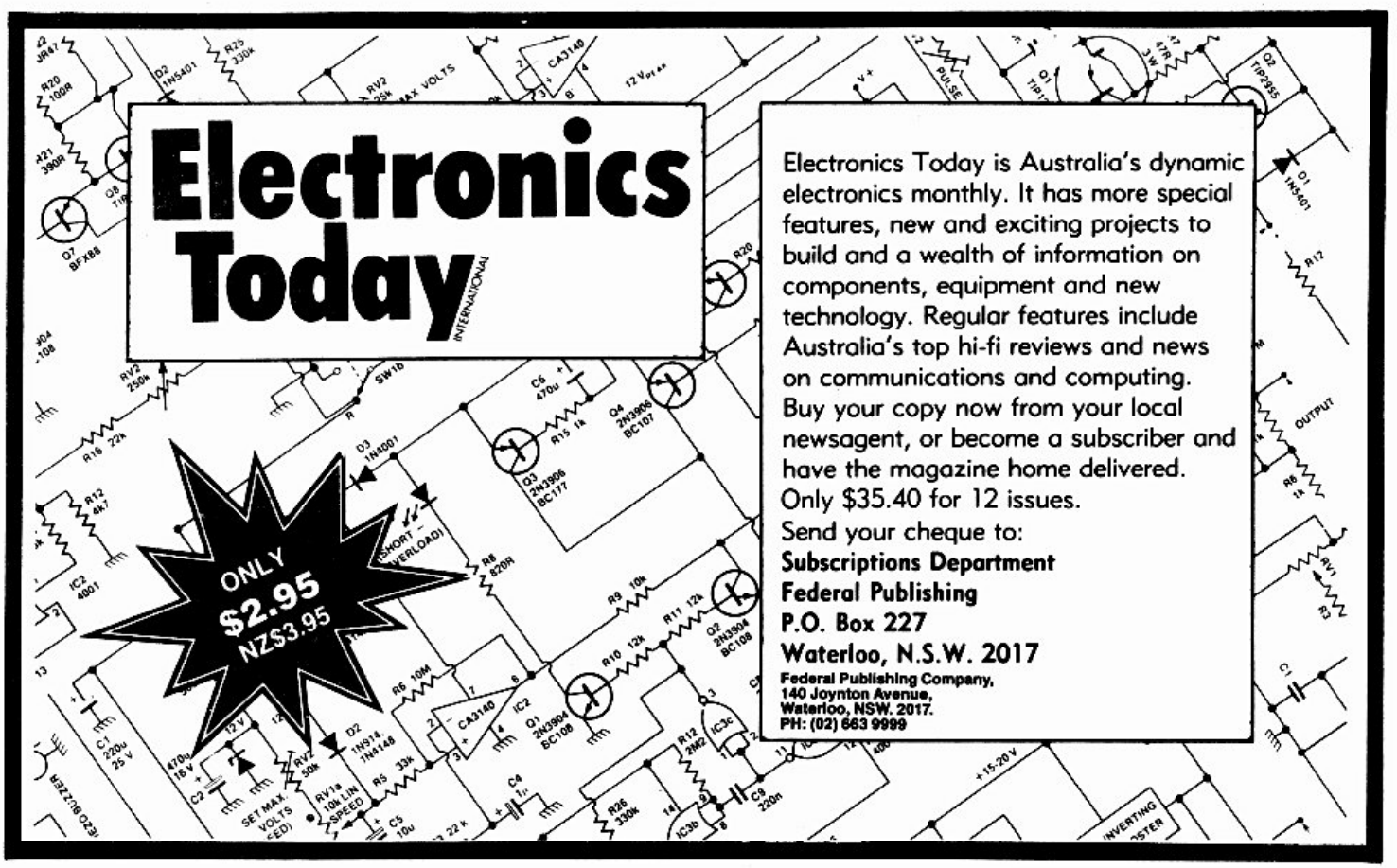
URSI, CCIR, CCITT, IEC, CISPR and Region 1 of the IARU.

The group of radio amateurs is led in Poland by SP9ZD and the West German group by Dr Gerhard Blechert DL9TJ and (Ministry of Science and Technology) and Gunter Schwarzbeck DL1BU (honorary technical officer of the DARC and manufacturer of EMC testing equipment).

The June 1986 meeting in Wroclaw was attended by 215 engineers and scientists from 19 countries. Dr John Allaway G3FKM, represented Region 1 of the IARU. The lectures are presented in English and Russian (simultaneously translated). Fred Johnson ZL2AMJ, described cooperation between NZART and the ZL authorities. The recent meeting in Zurich was attended by DL1BU (who was visiting Australia last month). He told me that most of the participating persons were either professors or radio amateurs!

This shows that we all can learn from each other about solving EMC problems. This writer hopes to get copies of the symposium lectures which dealt with EMC and amateur radio from G3FKM, DL1BU, and in the West German magazine *Funkschau* articles in issues 16 and 17 of 1986 by DL9AH.

ar



UNINTERRUPTIBLE POWER SUPPLIES

The Westpower Uninterruptible Power Supply is based on transistor regulated ferroresonant technology. The system is well-proven, exceptionally robust and provides a facility for very flexible load discrimination.

The design provides an extremely low component count which significantly increases reliability when compared with other units. It can also operate continuously with 100 percent imbalance of phases in a three-phase system (both single-phase and three-phase systems are available as is any required voltage output).

Units rated up to 1 kVA are available ex-stock and are housed complete with sealed, maintenance-free battery, in attractive cabinets to harmonise with modern office decor.

The Westinghouse Rectifier can also undertake on-site monitoring of power supplies using microprocessor-based equipment designed to identify a broad variety of mains aberrations. A full written report containing recommendations of the best solution to each client's individual problem is produced.

For further information contact Westinghouse Rectifier Pty Ltd, Box 267, Williamstown, Vic. 3016, phone (03) 397 1033.

ar

❑❑

CELLULAR MOBILE PHONE

For the busy executive on the move, there is now only one cellular mobile telephone that does not compromise according to David Gill of Captain Communications. David sells Novatel cellular phones, but found it necessary to add essential features wanted by people "on the move". His engineering staff have built the "perfect mobile phone."

"The Executive" is the perfect communications aid for people on the road, and is perfect for events like exhibitions and whenever an urgent "carry about" phone is needed. It is completely self-contained in its own rugged attache case, has automatically adjustable power output up to the legal limit of four and a half watts, works on all power sources, has an inbuilt high gain antenna built into the lid of the attache case and many other features.

For further information and pricing call David Gill, Captain Communications, 28 Parkes Street, Parramatta, phone (02) 633 4333.

ar

❑❑

NEW ICOM DEALER IN QUEENSLAND

Oblis Electronics are happy to announce that they have recently become a dealer for Icom Australia.

Oblis have, for many years, been leaders in the sales, service and installation of two-way radio, marine radios, citizen band radios and accessories to suit. They are now expanding their range and include Icom amateur, marine and commercial radios.

Fully trained technical staff include two licenced amateurs, Ian VK4YIP and Chris VK4TCH.

Oblis have recently moved to new larger, air conditioned premises at "Truck City", 1717 Ispwich Road, Rocklea, Qld. 4106, phone 875 1155.

The friendly staff at Oblis Electronics will be pleased to assist with any inquiries.

ar

AUSTRALIAN GOVERNMENT
Department of Science

IPS GRAFEX PREDICTIONS TAKE THE GUESSWORK OUT OF HF RADIO FREQUENCY SELECTION

Grab a GRAFEX and, during any particular month, GRAFEX will recommend the best:

- **Times**
- **Frequency Bands**
- **Average radio wave elevation angles for radio wave propagation between any two places.**

From $16 a year GRAFEX will improve your transmission and reception.

For further information and to order your GRAFEX predictions, please contact:

GRAFEX PREDICTIONS
IPS RADIO AND SPACE SERVICES
P.O. BOX 702
DARLINGHURST NSW 2010

IPS Radio and Space Services
162-166 Goulburn St. Sydney 2010
Telephone: (02) 269 8617

Name:.....

Address:.....

..... **Postcode:**.....

AMSAT Australia

Colin Hurst VK5HI
8 Arndell Road, Salisbury Park, SA. 5109

NATIONAL CO-ORDINATOR
Graham Ratcliff VK5AGR
INFORMATION NETS
AMSAT AUSTRALIA
Control: VK5AGR
Amateur Check-In: 0945 UTC Sunday
Bulletin Commences: 1000 UTC
Primary Frequency: 3.685 MHz
Secondary Frequency: 7.064 MHz
AMSAT SOUTH WEST PACIFIC
2200 UTC Saturday
14.282 MHz

Participating stations and listeners are able to obtain basic orbital data, including Keplerian Elements from the AMSAT Australia Net. *This information is also included in some WIA Divisional Broadcasts.*

ACKNOWLEDGMENTS
Contributions this month are from Bob VK3ZBB, Graham VK5AGR and UoSAT Bulletins.

AMSAT-AUSTRALIA NEWSLETTER
This fine monthly publication, published on behalf of AMSAT- Australia by Graham VK5AGR, now has 212 subscribers. Should you wish to subscribe, send a cheque for $20 made payable to AMSAT-Australia to AMSAT- Australia, c/- PO Box 2141, GPO, Adelaide, SA. 5001.

The newsletter provides the latest news items on all satellite activities and is a must for all those seriously interested in amateur satellites.

SUNDAY EVENING NEWS BROADCASTS
The value of the Sunday Evening New Broadcasts has been demonstrated once again in recent months with the launch of RS-10 and RS-11 and the commencement of the Fuji OSCAR 12 BBS Bulletin Board Service. The frequency is 3.685 MHz, at 1000 UTC.

SOVIET RS SATELLITES
RS-10 and RS-11 were launched on June 23, from a Soviet launch site as secondary payloads with COSMOS 1861.

Element Set	10
Reference Epoch	87 175.83580769
Inclination	82.9234
RAAN	52.3986
Eccentricity	0.0010447
Argument of Perigee	256.9500
Mean Anomaly	103.0527
Mean Motion	13.71876972
Decay Rate	6.0e-07
Rev #	21

RS-10 and RS-11 were built at the Tsiolkovskiy Museum for the History of Cosmonautics, in Kuluga, an industrial centre 180 kilometres southwest of Moscow. The chief architects of the transponders, called BRTK-10, were Aleksandr Papkov and Viktor Samkov. BRTK stands for the Russian equivalent of *Equipment for Radio Amateur Satellite Communication.* The overall project management is in the hands of DOSAAF, a military-related organisation whose major mission is the training of pre- draftage youth in militarily significant technology.

The following are the frequencies for the two new RSs:

RS-10

MODE	UPLINK BAND MHz	DOWNLINK BAND MHz
K	21.160 — 21.200	29.360 — 29.400
T	21.160 — 21.200	145.860 — 145.900
A	145.860 — 145.900	29.360 — 29.400
KT	21.160 — 21.200	29.360 — 29.400 + 145.860 — 145.900
KA and	21.160 — 21.200 145.860 — 145.900	29.360 — 29.400

Beacons: 29.357, 29.403, 145.857 and 145.903 MHz.
The RS-10 ROBOT uplinks are thought to be 21.120 and 145.820 MHz.

RS-10

MODE	UPLINK BAND MHz	DOWNLINK BAND MHz
K	21.210 — 21.250	29.410 — 29.450
T	21.210 — 21.250	145.910 — 145.950
A	145.910 — 145.950	29.410 — 29.450
KT	21.210 — 21.250	29.410 — 29.450 + 145.910 — 145.950
KA and	21.210 — 21.250 145.910 — 145.950	29.410 — 29.450

Beacons: 29.407, 29.453, 145.907 and 145.953 MHz.

FUJI OSCAR-12
The long-awaited Bulletin Board System (BBS) of Fuji OSCAR-12 has been successfully loaded and is apparently functioning well. Over one hundred messages were estimated to have been posted and received in its first few days of operation. This comes after more than 10 months of hard work and disappointment with earlier software problems and constraints on use imposed by a tighter than expected power budget.

Version 1.0 of the mailbox program has the following commands:

F — List latest 10 message headers with message number
F* — List all the message headers
R
<n> — Read a message. You will be asked receiver and subject.
Send <CR>. < CR> or <CR> ^Z <CR> to end the message.
K
<n> — Kill message numbered <n>. A message being read by other station/s cannot be killed. FO-12 BBS is a multi-user system. Only the originator of the message can kill messages.
H — Help.

The call sign of FO-12, which is used to connect, is 8J1JAS. If more than 50 messages are posted, older ones will be overwritten. Maximum available memory for message storage is 192 kilobytes. There will be no command to logout. Simply disconnect using the TNCs disconnect command.

While the BBS is in operation, the digital repeater is disabled.

UOSAT-2 DCE
In a symbolic, but significant achievement, a greeting message originated at the headquarters of the Radio Society of Great Britain (RSGB) has been relayed to the headquarters of the American Radio Relay League (ARRL). The relay was accomplished by satellite and terrestrial packet networks all within the amateur radio domain. The message originated by RSGB Secretary, David Evans G3OUF, in London, was sent to UoSAT OSCAR-11's Digital Communications Experiment (DCE), by the Surrey DCE station. It was then retrieved by K1KSY, in Massachusetts. K1KSY, recently commissioned his DCE ground station.

The message was then relayed via the terrestrial packet radio network to Newington, Connecticut, via W1AW-4. It was then delivered to ARRL Executive Vice-President, David Sumner K1ZZ, at ARRL Headquarters.

The UO-11 DCE has been in operation for several years but recently several additional DCE ground stations and special authorisation from the British regulatory authorities have facilitated the new milestones in DCE use.

PARTICLE/WAVE SURVEYS
UO-11 will be programmed to take a series of particle/wave surveys this week. The surveys will be taken in the evening (UTC), as the satellite crosses the Atlantic Ocean, and the data will be downloaded from the DSR at 4800 bit/sec on 435.025 MHz over Surrey each morning. C E Newton G2FKZ, from the RSGB Propagation Studies Committee is hoping that these surveys will show evidence that mechanisms other than multi-hop sporadic-E skip are responsible for summer-time trans-Atlantic openings on 50 MHz. "The problem we have is to find a rational explanation (for) the propagation mode that carries a 50 MHz signal across the Atlantic during June/July late in the evening." Present theories incorporating multi-hop sporadic-E are "not tenable," he says. So, with the help of the UO-11 P/W Correlator, Mr Newton is looking for a source of electrons that could charge the ionosphere during these openings. "If we can find (electron) precipitation in this zone, then that would be the start of a new theory." We will report the results of this experiment in a future UoSAT Bulletin.

AMSAT-UK/UOSAT COLLOQUIUM
Welcome to all those attending the Second AMSAT-UK/UoSAT Colloquium, at Surrey this weekend, July 19-20. This year's gathering, with a large and distinguished international contingent, promises to be an important meeting for the Amateur Satellite Service.

The International contingent includes Graham VK5AGR, and Ian ZL1AOX.

GEOSYNCHRONOUS TESTS PROPOSED
Representatives of AMSAT-NA, IRRL and TAPR, recently met with NASA managers and engineers at the NASA Lewis Research Center, in Cleveland, to map out plans for experiments on the NASA ATS-3 geosynchronous spacecraft. The general plan calls for experiments in new technology and exercising emergency communications systems.

TAPR's FO-12 modem, which has the 1200 baud PSK modem built in, will become an important experimental apparatus on the ATS-3 tests. Packet radio experiments using FSK had previously been tried on ATS-3 with poor results. The improvement using the PSK modems is anticipated to be substantial. The TAPR DSP Project will also likely find useful data resulting from the ATS-3 experiments.

ATS-3 currently serves a variety of users in the Pacific and Antarctica with various voice and data services. It has expended its station keeping fuel and its orbit is now inclined about 12 degrees to the equator. Nevertheless, its potential to serve as a test bed for Phase 4, pointed out by PY2BJO, last December, makes it attractive.

DOPPLER TRACKERS WANTED
Joe Bijou WB5CCJ, says he is interested in working with amateurs who are competent in making satellite Doppler measurements. Joe would like to set up some experiments to determine how well individuals can actually determine the Doppler shift and position of a satellite using conventional equipment and techniques.

These experiments may be important in terms of AMSAT's planned "Techno- Sport" activity next year, on Phase 3C. One major component of the Techno- Sport activity will be hidden transmitter location via satellite. For further information, please contact Joe at Silicon Solutions, (USA phone number) 713 661 8727.

ARIANE LAUNCHES TO RESUME
Sources indicate Ariane-space plans to resume launches from Kourou with the V-19 mission September 8. Getting this launch off on time is essential if the previously announced schedule is to hold. That schedule shows AMSAT's Phase 3C aboard Ariane V-22 as presently scheduled for January 1988. AMSAT is planning for the January

OSCAR-10 APOGEES — SEPTEMBER 1987

				SATELLITE		BEAM HEADINGS					
				APOGEECO-ORDs		SYDNEY		ADELAIDE		PERTH	
DATE SEPT 1987	DAY NO	ORBIT NO	UTC HH MM:SS	LAT DEG	LON DEG	AZ DEG	EL DEG	AZ DEG	EL DEG	AZ DEG	EL DEG
1	244	3172	1446:58	22	144	57	-2				
2	245										
3	246	3175	0145:18	22	310					302	-2
4	247	3177	0104:11	23	300					308	5
5	248	3179	0023:03	23	291					314	11
	248	3181	2341:56	23	282			306	0	322	16
6	249	3183	2300:50	23	272	304	-1	312	6	330	21
7	250	3185	2219:43	23	263	310	5	320	12	340	24
8	251	3187	2138:35	23	253	317	11	328	17	350	27
9	252	3189	2057:28	23	244	325	16	336	20	0	27
10	253	3191	2016:22	23	234	333	20	346	23	11	26
11	254	3193	1935:15	23	225	343	23	356	24	21	24
12	255	3195	1854:07	23	215	353	25	6	24	30	20
13	256	3197	1813:00	23	206	3	25	16	22	38	15
14	257	3199	1731:53	23	197	13	24	26	19	46	10
15	258	3201	1650:47	23	187	23	21	34	15	52	4
16	259	3203	1609:39	23	178	32	17	42	10	58	-3
17	260	3205	1528:34	23	168	40	12	49	4		
18	261	3207	1447:26	24	159	47	7	55	-2		
19	262	3209	1406:18	24	149	53	1				
20	263										
21	264										
22	265	3214	0023:31	24	306					305	0
	265	3216	2342:25	24	296					311	6
23	266	3218	2301:17	24	287					318	12
24	267	3220	2220:09	24	277			309	2	326	17
25	268	3222	2139:04	24	268	307	1	316	8	335	21
26	269	3224	2057:56	24	259	314	7	324	13	344	24
27	270	3226	2016:51	24	249	321	12	332	17	355	26
28	271	3228	1935:43	24	240	329	17	341	20	5	26
29	272	3230	1854:35	24	230	338	20	351	22	15	24
30	273	3232	1813:29	24	221	347	23	1	23	25	21

SATELLITE ACTIVITY FOR THE MONTH OF APRIL & MAY 1987

1 LAUNCHES

The following launching announcements have been received:

INTL NO — 1987	SATELLITE	DATE	NATION	PERIOD min	APG km	PRG km	INC deg
036A	Cosmos 1838	Apr 24	USSR	5hr 12m	17550	213	64.7
036B	Cosmos 1839	Apr 24	USSR	5hr 12m	17550	213	64.7
036C	Cosmos 1840	Apr 24	USSR	5hr 12m	17550	213	64.7
037A	Cosmos 1841	Apr 24	USSR	90.5	403	225	62.8
038A	Cosmos 1842	Apr 27	USSR	97.8	678	648	82.5
039A	Cosmos 1843	May 05	USSR	89.5	312	214	70.4
040A	Horizont 14	May 11	USSR	23h 21m	35174		0.5
041A	Cosmos 1844	May 13	USSR	102.0	879	861	71.0
042A	Cosmos 1845	May 13	USSR	90.4	400	217	70.0
043A	USA 22	May 15	USA				
044A	Progress 30	May 19	USSR	88.8	265	192	51.6
045A	Cosmos 1846	May 21	USSR	89.2	314	196	82.4

2 RETURNS

During the period 71 objects decayed including the following satellites:

1987-021A	Cosmos 1824	Apr 22
1987-034A	Progress 29	May 11
1987-035A	Cosmos 1837	Apr 28
1987-037A	Cosmos 1841	May 08
1987-039A	Cosmos 1843	May 19

3 NOTES

1979-057A — NOAA 6 was deactiviated on March 31, 1987.

—Contributed by Bob Arnold VK3ZBB

ar

date but believes a launch late in the first quarter of 1988 is more likely. Ariane launches have been on hold for a year, since the V-18 third stage developed an ignition problem resulting in the total loss of the mission. A new ignitor has now been qualified and thoroughly tested.

AMSAT OSCAR-10

Very good operating conditions have returned to AMSAT OSCAR-10, Mode B. Much improved sun angles and good co-operation by users in adhering to the operating guidelines have combined to provide the very good conditions.

Because of the favourable conditions and good user compliance, the command team decided to increase the operating time. Beginning Monday, June 8, UTC, the operating schedule was increased to allow operation from MA 20 through 250. This schedule will remain in effect until July 20. The satellite is currently experiencing perigee eclipse so it must not be used after MA 250. It is now concluded the two-metre omni-antenna is switched in line.

Please stay in tune with official bulletin sources for any schedule changes.

UOSAT-1

UoSAT-1 has returned to normal operations, although a small OBC software bug caused the WOD collections to malfunction last week. The new version of the 'Diary' for UO09 has been written by Steve Holder, and includes expanded command functions which considerably enhance spacecraft operations. The expansion of the UO-9 Diary does, however, consume more OBC memory with the result that WOD survey periods will be somewhat shortened — we cannot have everything!

UO-9 HF BEACONS

The UO-9 21.002 MHz beacon has been tracked regularly by G4VRC, at UoS — reports on reception of this beacon please.

UOSAT-2

Amateur Store-and-Forward Communications activity on the UO-11 DCE is growing fast with batches of messages being carried from individual amateur stations connected to the terrestrial amateur radio packet networks in the UK, USA and Australia.

SMOOTHED EPHEMERIS FOR OSCAR-10 de G3RUH

Epoch Year	1987	
Epoch Time	166.173272	days
Inclination	27.38	degrees
RA of Node	16.47	degrees
Eccentricity	0.603	—
Arg of Perigee	216.30	degrees
Mean Anomaly	0.0	degrees
Mean Motion	2.05877145	rev/day
Decay Rate	0	rev/d/d
Epoch Rev	3011	—
Semi-major Axis	26105.3	km
RAAN Dot	-0.1564	deg/day
Arg Peri Dot	0.2622	deg/day

de Colin VK5HI

ar

IAN J TRUSCOTTS

ELECTRONIC WORLD

FOR ALL YOUR COMPONENT REQUIREMENTS

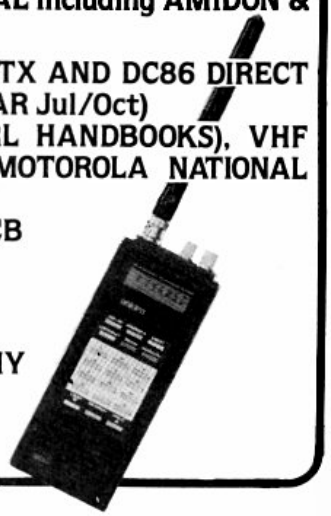
MAIL ORDERS WELCOME

30 LACEY STREET
CROYDON 3136

Phone: (03) 723 3860
(03) 723 3094

EXTENSIVE RANGE OF ELECTRONIC COMPONENTS FOR THE RADIO AMATEUR, HOBBYIST & PROFESSIONAL including AMIDON & NEOSID FERRITE PRODUCTS.

- STOCK DREW DIAMOND'S 4 WATT CW TX AND DC86 DIRECT CONVERSION RECEIVER FOR 80m (see AR Jul/Oct)
- AMATEUR REF BOOKS (RSGB & ARRL HANDBOOKS), VHF MANUALS, ANTENNA MANUALS & MOTOROLA NATIONAL DATA BOOKS
- FULL RANGE 27 MHZ & 477 MHZ CB RADIO & ACCESSORIES
- UNIDEN SCANNING RECEIVERS
- COMPUTERS
- WELZ TP-25A 50-500 MHz DUMMY LOAD — POWER METER



Club Corner

SHEPPARTON AND DISTRICT AMATEUR RADIO CLUB INC

The Shepparton and District Amateur Radio Club will hold its fourth Communication Day on Sunday, September 20. All previous events have been popular with amateur radio operators and those with just an interest in radio and communications.

Amateur radio is an ever changing hobby and, to prove this point, it is planned to have a computer display, based around communications, operating on the day. This will be IBM compatible and some Public Domain programs will be available.

This will provide a little "New Technology" to ease the burden of design. It is hoped to have participation of computer dealers as well as the traditional amateur retailers and distributors.

With many new rigs arriving on the market and prices starting to fall a little, there will be the chance to buy equipment at attractive prices. There will be participation of disposals dealers and a trade table. Catering will be available and tea and coffee is free of charge. Pay a visit to the Club on the day!

Talk-in will be on two-metre repeater, VK3RGV, (146.650 MHz) and HF (3.590 and 7.063 MHz). The Club Call Sign, VK3DBS, will be used. UHF CB repeater CH3/33 will also be monitored.

Early indications are that there will be a working AUSSAT station, a working packet system, demonstration amateur radio station, computer display and bargains from the dealers. What more could you want?

For further information contact the Club at PO Box 692, Shepparton, Vic. 3630, or phone Peter O'Keefe VK3YF, on (058) 21 6070 (AH).

ar

THE HILLS AMATEUR RADIO GROUP (Perth)

Attendances on the last Wednesday of every month in room C3 at Kalamunda High School (and visitors are always very welcome), average 32 amateurs, SWLs and upgrading CB operators, for lectures, demonstrations and videos.

Dine-outs provide regular opportunities for wives and girlfriends to join in.

Phil VK6ZPP and family, who took first place.

Fred VK6UR, who won fifth place overall, but rated first applause for his "hat array".

This program of involvement went one step further on Sunday July 12, 1987, when members, their families and friends took to their cars for a Radioactive Fun Rally.

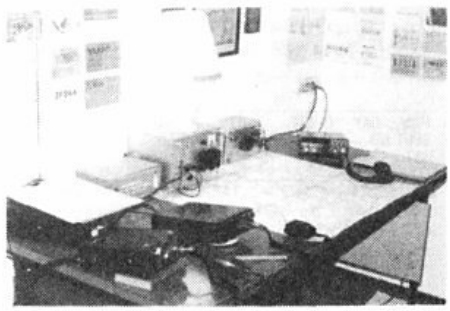
Organisers, VK6UV and VK6HQ, designed the rally around a 45 to 50 kilometre course, removing the need for speed. Maximum correct answers with minimum kilometres was the objective. Six of the 36 clues/directions could only be obtained by contacting Control on two-metres! A couple of these "check- points" were especially selected to be "scratchy" reception areas. In some cases, the two metre frequency to call on had, itself, to be worked out from the clues along the way. It was said that one mobile reversed to a better radio location to avoid penalty kilometres to make contact!

First place was won by Phil VK6ZPP and his family with a full set of answers and 45.9 kilometres. Phil's equipment was a TR-751A with 25 watts into a 4.2 dB seven-eighth antenna. Phil is a member of the Northern Corridor Radio Group.

Phil VK6ZKO, second place winners.

Second place went to Phil VK6ZKO, and family with 35/36 and an incredible 39.0 kilometres. Phil parked at strategic points and his boys sortied for clues! Phil used a FT-290R with two watts to a magnabase five-eighth in the centre of the roof.

Coming in a close third was another Northern Corridor team, that of Gary VK6XQ, also with 35/36 and an excellent 42.5 kilometres.



Ready to chart mobiles around the course at Rally Control.

The control station used three vertical antennas, an IC-245, FT-290R and FT-480R, plus an IC2A and indoor vertical on a Perth repeater for back-up. Once or twice both VK6UV and VK6HQ, at the Control Point, had their hands full!

Apparently everyone is talking favourably about the Rally and any odd gliches should have been eradicated by the time for the next one comes along!

Contribution and Photographs by John Hawkins VK6HQ, Secretary, HARG

ar

BRISBANE NORTH RADIO CLUB

The Brisbane North Radio Club held its Annual General Meeting on Friday, May 22, 1987. The new executive elected at that meeting is as follows:

President/Station Manager	Ed VK4ABX
Vice-President	Laurie VK4BLE
Secretary	Mike VK4BMD
Treasurer	Don VK4FBA

Don is the only member of the previous executive to run for re-election — President John VK4APZ and Secretary Noel VK4BIF, both decided to take a well-earned rest!

The Club meets every second and fourth Friday of the month, 1930 EST, at Room 23, Hooper Education Centre, Kuran Street, Wavell Heights. Visitors are most welcome.

The Club Net is held on USB at 0930 UTC each Monday on 28.420 MHz ±QRM. Net control is VK4WIN, usually operated by Ed VK4ABX, Club President and Station Manager.

Operators who contact club members can apply for the *Brisbane North Radio Club Award* by writing to the Awards Manager, PO Box 78, Chermside, Qld. 4032. To qualify for the award, Australian stations must obtain three points. Contacts with club members count for one point only, while contact with the club station counts for two points. Contacts can be only any band, but contacts via terrestrial repeaters and crossband modes are not recognised. Each club member can be contacted only once for the purpose of the award. Cost of the award is $A1, three IRCs or stamps to the value of $A1, whichever is appropriate to cover return postage. All awards will be fully endorsed with the mode of operation.

Michael Dower VK4BMD, Secretary, BNRC

ar

SUMMERLAND AMATEUR RADIO CLUB

The Summerland Amateur Radio Club has now completed arrangements for a new home at Richmond Hill. The one acre site has a large building with an adjoining garage, and these will admirably fulfill most of the Clubs needs. Line-of-sight restrictions preclude it becoming a repeater site, however, this is a small price to pay when compared to all the other goodies envisaged. Considering the last Club Rooms, the Goonallabah Scout Hall, was destroyed by fire in 1979, it will be pleasant to "hand-the-hat" and "put-the-feet-up" again!

A licence has been received for a new repeater, VK2RBB, situated on a mountain near Byron Bay. This should provide a better service for coastal

members and should be popular with amateurs travelling on Highway One. Further news about the channel, opening date, etc, will be published shortly.

Jim Cunningham VK2ESI, Publicity Officer, SARC

ar

RADIO ENTHUSIASTS CLUB OF THE BLIND

The Radio Enthusiasts Club of the Blind announces the Executive Officers, who were elected for the next 12 months at the recent 1987 Annual General Meeting:

Chairman	Frank Robinson VK3DBK
Deputy Officer	Robert Toseland VK3CTR
Secretary	John Machin VK3CCC
Treasurer	Brian Sitlington
Equipment Officer	David Ditchfield VK3YSK

The Club has been most successful since its inception in 1978, something of which the members can indeed be proud. However, the Committee is anxious that the Club sets fresh goals so that members enthusiasm does not wane. The Club has maintained a steady membership for the past nine years and it is very pleasing to see quite a number of members study for and pass their amateur radio examinations.

The Club usually meets on the third Wednesday evening of each month at the Association for the Blind, 454 Glenferrie Road, Kooyong, when matters of common interest regarding radio related topics are discussed. On a number of occasions the Club has welcomed guest speakers and members have had the opportunity to examine various items of equipment demonstrated by the speaker.

Members have visited Radio Australia's transmission facility at Lyndhurst and were afforded a very informative tour of the site.

Members have also joined with members of the Southern Peninsula Amateur Radio Club and Frankston and Mornington Peninsula Amateur Radio Club for an entertaining barbeque and field day.

Tribute is paid to the Club's Equipment Officer, David VK3YSK, for the wide range of projects he has undertaken. Amongst his commitments, David has been responsible for the construction of the Club's Mobile Operating Desk, which is almost ready for use. The material for this project was kindly donated by Bob Cunningham.

David also produces a recorded Newsletter, circulated on a C-90 cassette to blind people, locally and interstate. Anyone wishing to receive the Newsletter should contact David at the Association for the Blind, Kooyong, for further details.

Several technical publications are now available on cassette for visually handicapped people on a monthly basis. These are made possible through the kind permission of publishers and many hours of recording by volunteer readers. Len Childs and Roy Taylor are circulating C-90 copies of questions of technical interest produced in Great Britain by the QTI Talking Newspaper. Michael Gamble is regularly recording extracts from *Electronics Australia* and Tom Walsh continues his gigantic task of reading *Amateur Radio Action* and *Amateur Radio* each month. These are distributed on four-track cassette by the Royal Victorian Institute for the Blind. Thanks to the distributors and narrators of these magazines.

Thanks also to Bill Gates, the Association for the Blind, 3RPH, Maurice McKernan, Frank Feldman, Bob Cunningham and other amateur radio associates for the assistance given to the Club in various ways. All help is much appreciated.

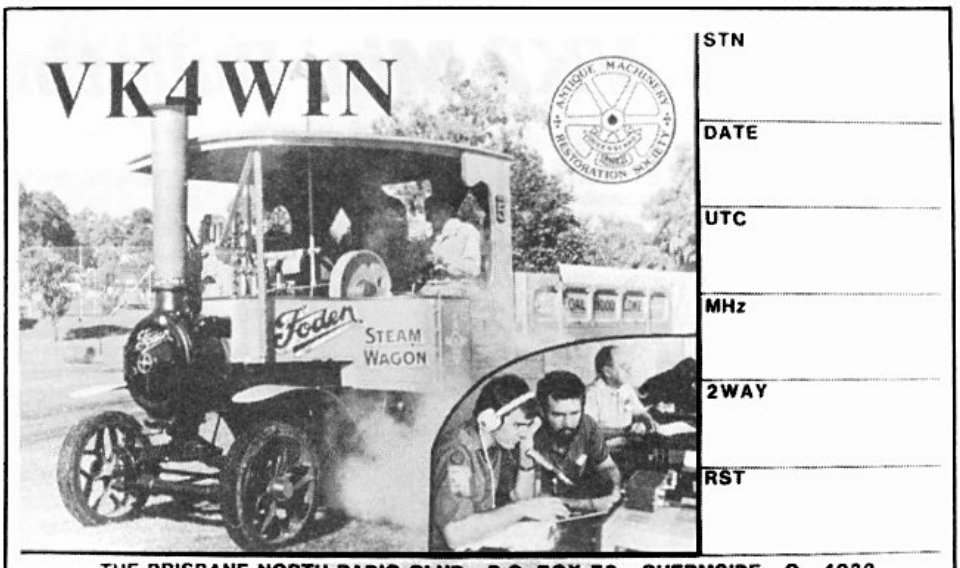
Contributed by John Machin VK3CCC, Secretary, RECB

ar

BRISBANE NORTH RADIO CLUB

From steam engines, dating from early this century, to the latest "black-box" amateur radio equipment, was the scene at the *Yesteryear Machinery Rally*, conducted by the Queensland Antique Machinery Restoration Society (AMRS), over the Queen's Birthday long weekend, in the North Brisbane suburb of Apsley.

The Rally is an annual event, and up to this year was located in one of the southern suburbs. As part of the attractions, the Brisbane Amateur Radio Club have always demonstrated amateur radio. To reciprocate, the AMRS demonstrate some of their antique machinery at the annual BARCFEST.



The Special QSL Card. The Foden Steam Wagon was one of the highlights of the antique machinery part of the Rally. The inset shows, from left, Laurie VK4BLE, Bill VK4MWZ, and John VK4APZ, operating the HF transceivers.

In an attempt to spread interest in their hobby around Brisbane, ARMS decided to hold their event alternately in the southern and northern suburbs. As North Brisbane is the area of interest to the Brisbane North Radio Club, the Brisbane Amateur Radio Club suggested that they would be the more logical club to co-operate in the 1987 Rally.

Brisbane North, in trying to spread the opportunity for publicity for the amateur movement as widely as possible, invited the South East Queensland and Teletype Group (SEQTG), the Brisbane ATV Group and the Brisbane Area WICEN Group to participate. It was unfortunate that the ATV Group were unable to attend, however the other two groups accepted the invitation.

In fact, in David Brownsey VK4AFA, the SEQTG has a very potent salesman. David set up two Model-15 teletype machines at the door, and visitors found it hard to pass his salesman's patter. After three days talking, David had practically lost his voice by the time the Rally concluded.

Brisbane North operated two transceivers, one mainly CW and the other SSB. Whilst the SSB attracted some attention it was the CW that drew the crowds. To cater for this interest, the operator wrote down the incoming Morse verbatim so that visitors could read over his shoulder. On the sending side, other club members gave a running precis.

The station, using the Club Call Sign, VK4WIN, was operated for the full three days by a series of rostered members. To confirm the many contacts made, a special QSL card was produced.

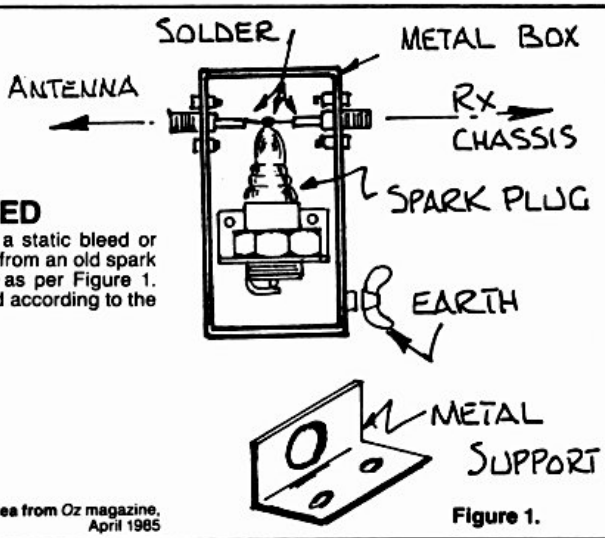
The interest shown in the Club's display, and also those of the SEQTG and WICEN, was most gratifying and the three groups will most certainly participate the next time the Queensland Antique Machinery Restoration Society comes to North Brisbane.

Contributed by Brian Mennis VK4XS

ar

STATIC BLEED

A cheap and simple device for a static bleed or lightening arrester can be made from an old spark plug mounted in a diecast box as per Figure 1. Gap distance should be adjusted according to the transmit power.



—Contributed by Allan VK4KAJ, idea from *Oz* magazine, April 1985

Figure 1.

VK2 Mini-Bulletin

Tim Mills VK2ZTM
VK2 MINI BULLETIN EDITOR
Box 1066, Parramatta, NSW. 2150

THE NOVICE PRIVILEGE DEBATE

This subject has raised a lot of discussion following the Federal Convention held in early May.

Divisional Council arranged a forum to discuss the issue in late May. A report of that forum was prepared and circulated to the various clubs for their comment and input to a second forum. All amateurs were also invited, by way of the broadcasts, for their own submission.

A second forum was held on July 3, to receive a report on the replies. Council, at their July meeting, considered the conclusions of the forum. A summary of the various points of view has been detailed in the report below.

It still appears that some further debate could be required on this subject as the opinions expressed in the various club submissions ranged from either in total support to total rejection, or at some point between these limits.

Council would like to thank both clubs and amateurs who responded.

This report summarises the results of two open forums, as well as submissions from clubs and individual amateurs, on the subject of suggested additional privileges for Novice Amateur Licence Holders.

It is clear that overwhelming support exists for the concept of a common band available to all classes of licence holders. It is recognised that, whilst there is divided support for the allocation of part of the 144-148 MHz band to novice licensees, there is little support for the allocation of the entire 144-148 MHz band.

A high level of support is indicated for the allocation of a part of the 70 cm band to novice licensees and this would appear to be the preferred option.

Little support was shown for the allocation of part of the six-metre band, or for part of both the six-metre and two-metre bands. Consensus was also reached that "data" modes should not be granted to novice licensees, regardless of what bands were allocated.

The subject of the current JA/VK reciprocal agreement was discussed and the general feeling was that this agreement was inequitable by virtue of the fact that it introduced a unique class of licence into Australia, access to which is not available to Australian amateurs of a similar technical level to their Japanese counterparts.

The Council of the VK2 Division of the WIA concurs with the feelings expressed by the various respondents and, as such, will forward this summary, together with all the relevant documentation on which it is based, to the Federal "Future of Amateur Radio" Committee, which has been instructed to examine this matter.

The findings and progress of that Committee will be reported through our normal channels of communication.

PUBLICATIONS

Our bookshop is out of stock with the 1987 *ARRL Handbooks* and Overseas *Call Books*. The next stock to be available will be the 1988 editions. To help determine the requirements, members are invited to place an order with the Divisional Office during the usual hours, 11 am to 2 pm Monday and Friday, or 7 to 9 pm Wednesday nights. Orders may be placed by personal attendance, by telephone on (02) 689 2417 or to the postal address at the head of this column. Advance orders will be taken for the 1988 *ARRL Handbook, 1988 International Call Book*, or the *1988 North American Call Book*. The expected price of each publication would be in the range of $35 to $40. Advance orders may be placed with the office until September 30, 1987. Delivery is anticipated to be in the early part of 1988.

Most other titles are available, ex-stock. A list is available from the office.

CONFERENCE OF CLUBS

The next Conference of Clubs will be held in November. A reminder to club secretaries that the close of agenda material will be Friday, September 11, at the Divisional Office.

DIVISIONAL BULLETIN BOARD

The Division has a trial Bulletin Board for the Sydney region, operating on the system operated by Andy VK2AAK, Channel 7600, call sign, VK2AWI. General information and some broadcast information is available. Members can leave information for the broadcast, addressed to VK2KFU. Please note however, information for the Divisional Office should be sent direct, in written form, via the normal postal address, PO Box 1066, Parramatta.

WICEN

A reminder that the Batemans Bay Car Rally Exercise will be held on Saturday, September 12. (This is a changed date from that quoted in previous notifications).

The Hawkesbury Canoe Exercise will be held over the weekend of October 10- 11.

A reminder that there is a WICEN Net for the Sydney region each Thursday evening at the new time of 9 pm, on repeaters VK2RWS, 7150/8275. These repeaters are available for general use outside activations and exercise periods. The time out on both repeaters is 30 seconds and the system must be allowed to fully drop-out before the next transmission, to get the full time period.

YOUR RD LOG

Have you posted your log yet? If not, please so so now to help the VK2 Division.

1988 IS APPROACHING FAST

How do you as an amateur, or perhaps the club you belong to, intend to celebrate and take part in various activities? A forum has recently been held in Sydney at Amateur Radio House in an attempt to find out. There will be many overseas amateurs who will be seeking special contacts with Australia next year (our Bicentenary). While the Institute or your club will be able to think up various activities, it will require your involvement to man the special event stations or to be on air to provide the contact. The Division is maintaining a register of activities and personnel able to assist. Please advise the Divisional Office of ***your*** plans. The Divisional Broadcasts will keep you informed of happenings when we become aware of them.

DIVISIONAL NEWS

There are many sources for you to catch the weekly news sessions.

First, there are the two sessions on Sunday. The morning at 11 am local time, with the evening session at 7.30 pm. The program may be direct from VK2WI or via the many relays. Should you miss these, there is the news highlights on the telephone answering machines at (02) 651 1489.

If you have packet radio, most of the material read live from VK2WI is available from VK2AWI, on 7600 in the Sydney area and on some other systems around the State. (Taped material is not included at this stage).

If you are able to view VK2TVG, in Sydney, on Channel 35.5, a summary of VK2WI material is included in the programs news segment. Some material also finds its way to the RTTY VK2TTY session.

Finally, your club net may obtain a copy of the material from the bulletin board and use it during the nets.

Through one of these sources you should be able to keep in touch with the various happenings and events which play a part in the amateur radio activities in VK2.

NEW MEMBERS

The Division would like to welcome the following who joined with the July intake.

J M Brook	Assoc	Campbelltown
F T Dickson	VK2FTD	Lane Cove
N J Kirk	VK2ENA	Condobolin
G E F Voigt	VK2MAJ	Ermington

TWO METRE SIMPLEX CONTEST

In an attempt to encourage non-repeater activity, a two-metre simplex contest will be held on the evening of Friday, September 25, 1987, between 2100-2300 hours local (9 to 11 pm). Operation to be in the segment 145.000-145.600 MHz. Mode FM. Contact — exchange a three digit number (starting at 001) and your postcode, one contact per station. Scoring — one point per contact. Final score — number of contacts multiplied by the number of different postcodes worked. Area of operation — throughout VK2.

Logs to be returned to Contest Manager, PO Box 1066, Parramatta, NSW. 2150, by October 2, 1987. Sections — City and Country highest scores. Event Co- ordinator — Peter VK2EMU.

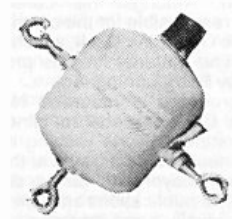
Further details in the various broadcasts, or in an information sheet from the Divisional Office, or most clubs.

SLOW MORSE SESSION

Operators are still urgently required for the nightly VK2BWI session on 3.550 MHz. Vince VK2CVR, has had a change of work location and times which prevents him continuing as the co-ordinator. The number of operators have fallen in recent times leaving some nights uncovered. Most of the current team are novice licensees and thanks must go to them for continuing with the session. The more operators, the lighter the load on the rest, so this is an opportunity for those who like the mode to train others to follow in their footsteps. If you can help, please check into the session at 7.30 pm and advise Ross VK2BRC, of your interest. Alternatively, contact the Divisional Office.

ar

THE NEW QRO HF BALUN
ATB-1



- For HF beams, dipoles and inverted vees
- 1:1 ratio, 50 ohms
- Broadband 1.8-30 MHz
- Heavy Duty 2-inch toroidal core and polyester insulated wire
- Rated at more than legal power
- Replaces Centre Insulator
- SO239 Connector
- Prevents feeder radiation, fights TVI and RFI
- Quality made in Australia

Only $A55.00 Post Paid VK, ZL and P29
DX Airmail $A65.00

Cheques please to:

Alpha Tango Products

Box 441 Kalamunda 6076
Western Australia
75 Lawnbrook Road, Bickley, WA. 6076

VK4 WIA Notes

Bud Pounsett VK4QY
Box 638, GPO, Brisbane, Qld. 4001

EXPO 88

Yes, amateur radio will be displayed at Expo 88 in Brisbane, from April until October next year. As yet, there are no details but we do know that something in the region of $50 000 worth of space will be available to the Institute, free of charge. The other good news is that transmissions from the site will be allowed.

At first, there was a complete ban on any radio transmission from Expo 88, but after the good work of John Aarsse VK4QA, and Theo Marks VK4MU, this has now been lifted. Next month much more will be known and the Expo 88 amateur committee will be getting down to some solid organising. The biggest problem will be the manning of the amateur exhibit for a period of 184 days.

THE JACK FILES MEMORIAL CONTEST

It was very pleasing to note the excellent support that our Queensland contest received this year. The operating was of a very high standard and it was indeed a very friendly and enjoyable affair. This year there was plenty of publicity. The rules were in *Amateur Radio, Amateur Radio Action* and in our Queensland insert in AR, *QTC*. As well as this, the contest received many mentions on the VK4WIA news broadcasts. Conditions were not very helpful and 80 metres carried almost all the traffic on the Saturday night. However, 40 and 20 metres proved to be the best bands on Sunday morning. Pity the poor novice operators who had to put up with an almost dead 15 metre band. The preferred band segments for both CW and phone worked extremely well. After speaking with Joe Ackerman VK4AIX, the Queensland Contest Manager, it seems likely that there will be a separate CW section in 1988.

73, Bud VK4QY
ar

David Jerome VK4YAN, the Divisional President, proudly displays the Remembrance Day Contest Trophy which was won last year by VK4. It is ours to keep for this year — time will tell.
Photograph courtesy Bud Pounsett VK4QY

VK3 WIA Notes

NEW MEMBERS

The following applications were received for the month of June 1987 and accepted by Council on June 25, 1987.

Robert Beacham	VK3MAC
Cyril Black	VK3KUZ
Daniel Dobrosak	VK3KKW
Peter Fawcett	VK3APF
Sydney Fullarton	
Kenneth Goninan	VK3PUA
David McLachlan	VK3XQH
John Manganas	
Larry Micallef	VK3ZLM
Ian Morris	VK3TAD
Robert Parker	VK3XRP
Julian Rose	
Norman Smith	VK3BDE/ WA6ABD
Bruce Watts	

ar

QSP

ABC EXPANSION

Four million rural Australians will soon have a choice of two ABC radio stations.

The Communications Minister said the extra service with some 300 new transmitters and an upgrading of 33 existing regional stations would be completed by 1992.

THOUGHT FOR THE MONTH

A fool says "I can't" a wise man says "I'll try"!

Five-Eighth Wave

Jennifer Warrington VK5ANW
59 Albert Street, Clarence Gardens, SA. 5039

Despite the fact that the school holidays might not have been the best time to hold a working bee, I would like to thank the following who did turn up to help. Bill and Gill Wardrop, Sue and Steve Mahoney, Max Brandt, Don McDonald, Darcy Hancock, Lloyd Jury, and Hans Van Der Zalm. For once, the non-council members out-numbered the Council members.

Jobs completed included, weeding the outside area, cleaning the outside of the windows, making the classroom windows shut again, replacing the clock and the trophy case front (taken down for decorating) and Lloyd has started work on a screen (for want of a better description) to stop Gill freezing to death when she serves the tea and coffee at meetings!

There are still a few jobs left so we still might have another working bee. We are looking at improving the old "Pug Hole" area and will start by planting the slopes with ground-cover plants to keep the weeds down. We would also like to pave the central area with paving stones or bricks, so if you have any of those items (including the plants) please let us know, we would be pleased to hear from you.

We reason that it would not only make less work, it would also be possible to use it as a barbeque area from time to time.

I would like to thank Merv Millar VK5MX, for his generous donation of a new clock in the transmitter room. I understand that the old one had ceased to be reliable and Merv took it upon himself to organise a replacement and has donated it to the WIA. This is not Merv's only generous act. Besides being one of the 160 metre operators for the Sunday morning broadcast and keeping the 10 metre beacon running; about this time every year Merv donates $20 and a certificate which he had printed, at his expense, to the best newcomer on the Display of Members' Equipment night (at the September meeting). Called the "Millar Award" its aim is to encourage new home-brewers within the hobby. With this in mind, and the chance to win several other vouchers and the ICS Award, presented annually by John Moffatt, of International Communications Systems, from Port Adelaide, for the best overall winner, I hope that you will bring along your latest piece of home-brew equipment, be it a transmitter, receiver, piece of test equipment or something else relevant to the hobby, and demonstrate it (or at least talk about it) at the meeting on Tuesday, September 22.

Lastly, would you please give some thought to our activities next year for the Bicentenary. So far the only thing that we have been asked to be involved with is a special event station at Walford Anglican School for Girls. No date has been set for this.

If you have some suggestions for suitable types of activity please let us know. By next month we may even be able to name a co-ordinator (or we may be calling for volunteers!).

ar

TIME TO SMILE AWHILE

It is the little things in life that make you happy, but only if you cannot get your hands on the big things!

* * *

Give some people an inch and they'll call a surveyor!

* * *

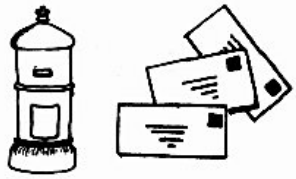
Home is a place where a man is free to say what he pleases because no one is paying any attention to him anyway.

* * *

Remember — patience is a virtue that takes too long.

From Lee KH6BZF in *KH6BZF Reports*

Over to You!



Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

ODE TO THE WHINGERS

I received my AR Journal, the month it was July,
I read the members letters, they nearly made me cry!
They were all about subscriptions, so much money to be paid,
Everyone was crying poor, it made me quite dismayed!

As I am on a Pension of just ninety bucks a week,
All their crying and their wailing, seems to me an awful cheek!
For *I* pay my subscription every time it comes around,
And I think I'm very lucky that the price has been held down!

Don't they realise the goodies that the Institute provides,
With AR posted monthly, and the benefits besides?
So stop your Cussed Whinging, and get up off the heap,
The subscription to the Institute, ***is really very cheap!!***

Ray Price VK2AWQ,
26 Bay Street,
Tathra, NSW. 2250
ar

STRICT BUDGET

I have been prompted to write this letter by the editorial in the July edition of AR, as well as the letters written by W D Verrall VK5WV, Steve Curtis VK3CAX and Maurie Dewhurst VK5PMD. I have held an amateur licence since November 1981, and am currently 25 years of age. I am also a little disturbed about the direction that amateur radio is taking.

For the past three and a half years, I have been a full-time tertiary student, and due to the necessary self-imposed strict budget limitations, have been unable to continue as a member of the Wireless Institute of Australia. Until now! Why did I rejoin? Because I am in need of a QSL Bureau.

This last statement, which may seem a little irreverent considering that the WIA exists for the benefit of all amateur radio operators, might cause some others to wonder as to the reasons why they are members. I do read AR, and enjoy doing so. In the past I have had access to it via financial members. It will be a pity if it is to suffer because of the current state of the economy.

During a recent discussion with some other amateurs regarding the lack of young people in the hobby, it was revealed that yesterday's potential amateurs are probably today's computer enthusiasts. The comment by Steve Curtis VK3CAX, could be seen as proof of this. I get the feeling that these days, amateur operators can target high school students as potential members of the hobby, but they can also expect a time lag of up to eight years until those student become amateurs. Why? Most likely because of the current price of amateur radio equipment. In comparison, relatively cheap entertainment can be provided for the whole family by a home computer. Why not build your own equipment? Who wants to go through the experience of home-brewing a transceiver when one can just turn to the home computer for a meaningful and educational pastime?

No. I am not against home-brewing. Far from it. The only working piece of equipment I have at my QTH is a home-brew one watt CW rig for 40 metres. The next piece of equipment I will bring to operational use will not be an "all singing, all dancing, price on application (because we don't want to scare the daylights out of you)" rig which operates for you while you do something else. It will be home-brewed, albeit based around the IF strip and PLL circuitry taken from an SSB CB unit. Why go to all that trouble, some may ask? Well, you never know, but I may learn something about radio! And, if my rig goes QRT, at least I can fix it!

Both Steve VK3CAX and Maurie VK5PMD, make valid points in this direction. Drew Diamond and others have shown people that home-brewing is not so hard. These amateurs are to be commended for their efforts. Unfortunately, the non-availability of parts for the general home-brewing of RF equipment does nothing to encourage people. I think a standing joke up here in VK4 is hearing about someone trying to find a local supplier for something as simple as an RCA CA3028 amplifier! A typical answer from retailers is "I'm sorry Sir, we don't have those in stock."

It is my impression that if amateur radio operators do not start turning the hobby back into a scientific one, then amateur radio as we know it will not exist, say, 20 years from now. "Grim Reaper" thoughts, some may say. But, if we do not do something about it now, tomorrow may be too late. We could be facing a "use it or lose it" situation with the under-populated 70 centimetre band sooner than currently anticipated. A large number of amateurs appear to have given up experimentation and instead act like high- power CB operators. Eventually, maybe not tomorrow, or next year, but eventually the government and the people are going to ask "Why do we need these amateur radio operators anyway?" It is a thought that we all should bear in mind.

73

Michael Dower VK4BMD,
10 Chartwell Street,
Aspley, Qld. 4034.
ar

MEMBERSHIP — A MARKETING APPROACH

I read with interest letters from VK3CAX, VK5WV and VK5PMD, in AR, Vol 55, No 7, July 1987. Also the editorial of the same issue also on the subject of membership and how to contain costs, etc. Many other members have written on this subject in past editions of AR.

Ladies and gentlemen, may I be so bold as to say that we (ie the WIA and its members) may be taking a negative and defensive approach to this problem. After all, being defensive can ultimately lead to one backing oneself into a corner with nowhere to go.

In today's business world, the art of marketing is used extensively to evaluate, develop, manufacture, distribute and sell products and services. Very few companies exist today without some sort of marketing input. In the medium, to larger corporations, this function is performed by a professional marketing practitioner.

The WIA has products and services. Don't be under the misapprehension that these will sell themselves. Some might, but one must bear in mind that today's society is, albeit unconsciously, geared towards having products marketed to them.

All products, services, and the companies that market them have **S**trengths, **W**eaknesses, **O**pportunities and **T**hreats. (SWOT, remember that!).

They also have **F**eatures, **A**dvantages, **B**enefits. (FAB, remember this too).

In simple terms, to market a product or service, the four Ps of marketing *must* be applied. They are:

Product
Price
Place
Promotion (Yes, remember this as well).

You may not be aware of it, but most of the things that you purchase are a direct result of some form of marketing campaign. "No" you say.

Well, ask yourself this, (and answer honestly!) when was the last time that you purchased something that you could have done without?

Products and services fall into two broad categories — needs and wants! You may have purchased that new linear amplifier because you *wanted* it, but it is quite questionable whether you *needed* it or not (a higher gain antenna may have been a better all-round choice!).

The point I am making is that WIA membership could be sold to a person not currently desirous of membership with good marketing and sales tools.

Go back to the little marketing lesson above — SWOT, FAB, 4 x P. There is no reason why a suitable marketing campaign could not be successfully mounted by the Institute. All that is needed are the right people.

There must be some marketing people out there who could formulate such a campaign. My own view is that it would be better to have marketing people who currently are not members of the Federal Executive, or State councils.

I suggest this simply because being closely involved in a situation can often promote tunnel vision, and thwart one's ability to think laterally.

A fresh, unbiased approach is needed. Perhaps some of the cynics who do nothing but knock the WIA (members and non-members in particular) would be interested in contributing.

Amateur Radio Action appears to be a great forum for these type of people who appear to lack the fortitude and tenacity to join the Institute and make change for the better. It appears all too easy to sit back and pick, than to be constructive.

Don't misunderstand me, I am not suggesting that the knockers out there in anti-WIA land are stupid, far from it. But for the good of the hobby, amateur radio, this would appear to be a great way for them to actively participate in a campaign to:
(a) increase WIA membership
(b) put forward a working model of what the Institute should be, to attract and better serve the amateur today.

Membership pricing, etc, have been put forward as reasons for not renewing membership. But how many of us purchase things throughout the year that we want, but don't really need?

Pricing is often only a small barrier to the marketer!

Well, how about it? I guess I have thrown down the gauntlet to some degree but I believe it is worth a try.

I am prepared to be part of a sub-committee or whatever, to tackle this most urgent problem, but it is not a one-man job.

There must be talented marketing people out there who can make a contribution.

I would be interested in the Editors comments as well I await your feedback from members, and non-members alike.

Yours faithfully,

Bruce Kendall VK3WL,
8 Walwa Place,
Werribee, Vic. 3030.

Thanks for your suggestions, Bruce. Much food for thought. Ed.
ar

MAKE US PROUD, NOT ASHAMED

I am outraged at what you are doing to my magazine, *Amateur Radio*. Of course costs are increasing, and of course you have to be frugal, but how dare you decide that I can't afford it so you are going to emasculate it.

Instead of the "Victorian Cringe," the rats-in-the-hole syndrome, you should be telling us how lucky we are to have the best magazine available, and the price is going up to maintain that excellence. Instead, all we get is this poor mouth attitude — "Gee, fellas, **we** think this is an overpriced, poor relation publication so we have decided to downgrade it further."

There will always be a minority of members who say they are too hard up to afford AR. I would ask them, how many cigarettes do they smoke, how many beers do they drink, how much do they put through the poker machines. Maybe they cannot

choose AR over some other discretionary expenditure, but how dare **you** decide for me that I cannot afford AR either. For the genuine cases of low incomes, there can always be "pensioner rates," or some minor arrangement.

Look at the number of magazines available in the newsagents today. There are literally hundreds of computer, electronic, and similar hobby magazines vying for the consumer dollar. The point is they **are** being sold, and not one of them is apologetic about its existence, or its price.

Consider the locally produced radio/electronic magazines — I venture to say that each WIA members buys one, or more likely **all**, of them each month. These magazines sell for between $2 and $3.50 each, and one even costs $4.75 (may they rest in peace).

If AR is perceived as value, then we **will** buy it, and may I suggest that it would be no hardship to delete one of the other magazines to do so, if finances are so critical.

I note with dismay that you are going backwards to a two-colour cover, but this is a typical defeatist solution. The problem is not going to go away — costs will be even higher next year — what are you going to do then, leave out the ink?

The amateur community needs communication. The efforts of the WIA in this regard has always been poor, but deliberately reducing the communications, by going to six issues per annum, or worse still, leaving it up to individual States to do their own, unco-ordinated thing is tantamount to disbanding the WIA. In case you think I exaggerate, look back over the pathetic history of the WIA, the splinter groups that formed, the States that went their own way because no common thread held them.

This country has more disposable income than ever before, there are very few **genuine** poor amateur operators, we **will** buy a more expensive magazine, and we want to be proud of our only WIA amateur publication. For heaven's sake, stop being so down in the mouth and think positive. Put the price up sufficient to maintain the only good thing that has come out of Victoria, and tell everyone how great it is, how it should be twice the price and how lucky we are to have it. Make us proud, not ashamed!

Yours sincerely,

Colin MacKinnon VK2DYM,
52 Mills Road,
Glenhaven, NSW. 2154

ar

NOT A MATTER OF PRIORITIES

As a small boy I was offered the choice of a Mars bar or a coconut slice; not both — that would have been considered greedy. I chose what I enjoyed most.

One Winters evening in 1952 I had a home-brew TRF receiver and a 'spider's web' transmitter spread out on the setee, together with a 350 volt power supply modified to produce 700 volts. Before the electrodes blew up, ruining the seat covers with an evil smelling goo, which invoked a barrage of startled and choice invective from my wife through a thick chemical fog, I worked Lima, Peru. My first CW contact ever. The joy and excitement of that occasion was eclipsed in 1953 when I became G3IBR.

Currently, I enjoy the absolute magic of an IC-720A black box; although my novice son (VK2MRL) and I are working on a home-brew 80 metre CW unit for portable use. (We both need to get our CW into shape).

Naturally I am nostalgic about the past but I have no wish to, neither can I, go back there. By the same token, downgrading AR would be a retrograde step which could be effortlessly avoided. All it would cost me is about 10 cigarettes or a glass of alcohol per week. It is not really a matter of priorities but what we enjoy most. So let us do it! Print and be damned is the appropriate cliche, I think.

Yours, 73,

Don Law VK2AIL,
RMB 626 Adelong Road,
Tumblong, NSW. 2729

ar

STANDARDS

I am disturbed but not surprised at your comments in response to VK3ANJ's letter in June AR.

Any private organisation must, by definition, have allegiance to its members . . . deny this and you will lose even more of your members!

The WIA in seeking to improve the well-being of its members could well be very much against the interests of the members of the Australian Amateur Radio Movement who are not members of the Institute.

Because the WIA is a privately aligned organisation it cannot be truly impartial, which must, by any "equal opportunities" be a disqualification when becoming involved in areas which affect non-WIA members.

Indeed, increased numbers provide economies of scale. However, these increases necessitate increased responsibility . . . a virtue which the Institute as a whole finds difficult to understand or locate.

Yours sincerely,

A D Tregale VK3QQ,
73 Nepean Street,
Watsonia, Vic. 3087

(Footnote) A letter was received from VK3ANJ (see elsewhere in these pages) but it raised different topics. Ed.

ar

WON'T DAMAGE IMAGE

Our executive members are accountable to the ordinary members but if we do not know what they are doing how can we know what they are doing wrong?

Ordinary members do not know what the executive are supposed to be doing.

In the interests of a better informed membership would you consider donning an 'independent editors' hat and publish the following in AR?

Division and Federal Constitutions or the equivalents. (That might occupy one issue).

Proposed agenda for council meetings for timely comment by members.

A resume of the motions put at each council meeting and the results.

I am sure those 'crumbs' would quell temporarily the growing unrest among the 'plebs.'

I have put similar suggestions to executive councillors but most have been impolitely and effectively ignored.

It will not damage your image if you hang up that apologist's hat for a little while.

Yours sincerely,

Lindsay Lawless VK3ANJ,
Box 112,
Lakes Entrance, Vic. 3909

(Footnote) The Federal Memorandum and Articles of Association run to 32 double spaced A4 pages. I assume each of the seven Divisions would be of the same order. One issue? Executive agenda normally precede meetings by only a few days. Divisions are probably similar. Executive and Divisional minutes could be published, but space is already insufficient. Selected highlights are covered by Federal broadcast tapes, also computer bulletin boards in some areas. Ed.

ar

DON'T LOWER THE STANDARDS

Recent discussions re increasing amateur radio membership have one thing in common — lower the standards, and remove some of the hard work needed to gain a licence. While we are in this frame of mind, I put forward a plea on behalf of a large group of potential members — the retirees.

At an ever increasing rate our society is changing to a position where we now have more people leaving the work-force than entering it. In a word, there are now more wrinkles and they are increasing at an alarming rate. They have the financial resources to take up a new hobby, at a time when they have the time and the need for new interests.

They have fewer outlets for their time and money than the young. There could not be a better hobby for a retiree than the means to maintain contact with his fellows, to have the refreshment of new fields, the need and opportunity to stir his little gray cells, and getting him from under the feet of the little woman would be a public service.

There is a new crop of retirees every year, so once the area is tapped, the flow will continue. Naturally there is a catch.

From, say, 50 years of age, most people suffer from a deterioration of memory. The medical fraternity call it short term memory loss. This complaint has the effect of making our examination system more difficult for the old than the young.

My plea is not to lower our standards, but rather to make it equally difficult to enter our ranks irrespective of the age of the potential member. There are enough penalties to growing old, let us redress the balance. Grade the pass rate to the examinee's age. Tap the retiree potential and help society as much as we help ourselves.

Short term memory deterioration is well-known and documented, medical advice could, no doubt, put a finger on the disability. Maybe a pass rate of 68 percent for 55-years, 65 percent for 60-years and 60 percent for all over the age of 65-years!

The retirees will still have to work harder than the young, but at least let us recognise and reward their harder effort.

Yours sincerely,

Hal Wise VK2HW,
4 Turner Street,
Balmain, NSW. 2041

ar

NOVICES ON TWO-METRES

It is my opinion, and always has been, that novices should be allowed on two-metres.

However, not with all privileges. Simplex only and 10 watts power. After all, they must have something left to update to.

Nine or 10 years ago, when the novice licence was introduced, the mistake was made then not to give novices a band on which they could communicate with **all** amateurs.

All this time novices have not been able to speak to limited licence holders. A common band is a must.

Six metres has two things against it. The availability of equipment and the TVI problems that it would cause in certain areas. 70 cm is another band that could be used, however, once again, the equipment is limited and expensive.

The logical choice is two-metres, but let us not give too much away for free.

Incidentally, if it is okay to give novice licence holders two-metres without a special test, then why not give the limited licensees the same HF privileges as novices (phone only). If it is fair to one it is fair to the other!

R K Rehe VK4AIO,
7 Guardsman Avenue,
Alexandra Hills, Qld. 4161

ar

AMATEUR RADIO IS NOT WHAT IT WAS

Having read and heard extensive comment on the subject of two- metre privileges for novice licensees, and having attended two forums conducted by the VK2 Division of the Institute, I should like to make some observations of my own.

It is obvious that this proposal cannot be dealt with in isolation, but must be looked at in conjunction with the wider consideration of the future direction of amateur radio. Realisation of this seems to have polarised most amateurs into one of two groups. These might be described as, on the one hand, conservative, reactionary or idealistic, and, on the other, progressive, pragmatic or realistic. After reflection, I must support the latter.

The first group appears to contain a large proportion of "old-timers", full and limited-call amateurs, who seek to preserve the hobby as it has always been, who emphasise its general and experimental nature, and who are concerned with such aspects as "maintenance of standards" and "quality of content." They adhere to the belief that a comprehensive technical knowledge should be a prerequisite for licensing, and that even the novice standard is adequate only as an interim measure. What they do not seem to realise is that these views are only relevant within the fraternity, and have little bearing on the attitudes of commercial interests or such external bodies as DOC.

The second group appears to be composed of

those members from all sections of the service who have the vision to see that only an increase in our numbers will preserve for us the spectrum space we now occupy. The success of Japanese and American moves to increase their numbers must be an indication of the way to go. We must acknowledge the changes that progress in technology has brought about. *Amateur radio is not now, and can never again be, what it was.*

I believe that amateur band usage should not be related to technical expertise when we see, in commercial and government operations, the use of much higher powered and more sophisticated equipment by totally unqualified personnel. The equipment is, of course, type-approved by DOC. If there is to be a fundamental change in our licensing system, I feel that it should start with a basic licence permitting low power telephony operation on amateur bands above 30 MHz, and that the required technical knowledge should be confined to that necessary to operate type-approved equipment, which should be the only kind of equipment authorised for use by amateurs in this licence category. From that point, licensees should be able to progress to participation in other aspects of the art, such as home-brewing, experimental work, CW, and digital techniques, etc, by demonstrating their ability in those aspects and having their licenses endorsed accordingly. Once their endorsements cover the international requirements for HF operation, they should be allowed unrestricted access to all amateur bands. This approach would end the situation where a full-call amateur is permitted to operate all authorised forms of equipment in all authorised modes, notwithstanding that very few, if any, such amateurs are familiar with all of these forms and modes. This is particularly true of full-call amateurs licensed 20, 30, 40 or more years ago, and who have never had to demonstrate their knowledge of more recent developments.

If this proposed basic license smacks of CB-type operation, I do not see that as an obstacle. One reads and hears deprecating references to CB operation by amateurs, and yet many amateurs use their equipment for exactly the same purposes, and surely this is a legitimate aspect of the hobby! Perhaps, if a scheme such as I suggest had existed at the time the CB service was first approved, many of the CB fraternity, some of whose operating ability and enthusiasm would put many amateurs to shame, would now be part of a larger, stronger and more influential amateur body.

Further, I would suggest that we would no longer need a segregated call sign system, except, perhaps, to distinguish all-band amateurs from those confined to above 30 MHz. With adequate penalties under the Radcom Act, and with computer access to each amateur's licence conditions, breaches could quickly be established during random inspections or in cases of unacceptable operation and offenders brought to book.

Finally, I would say to the idealist, be careful that, in trying to preserve an outmoded concept, you do not wind up with a greatly reduced spectrum allocation in which to work.

Yours sincerely,

S V Ellis VK2DDL,
98 Holmes Street,
Kingsford, NSW. 2032
ar

QRO OR QRP BY TV

Australian amateurs beware — your transmitter power could be controlled by your neighbour's domestic entertainment equipment!

There are indications the UK DTI (DOC) is considering adopting CENELEC proposals for "receiving" apparatus immunity.

In broad terms, the CENELEC draft specifies a series of tests to be performed on domestic entertainment equipment based on a local transmitter producing a radiated field strength of 1.8V/m at the item under test.

Some idea of the effect of this very low immunity figure is illustrated by a station on the two-metre band running 150 watts to a nine element Yagi at 20 metres. The RF produced gave a 6V/m field strength alongside a television receiver in an adjacent property, when beaming in that direction.

In this instance it would be necessary to reduce the transmit power to 10 watts in order for the field strength to meet the 1.8V/m limit.

If these proposals are adopted it will mean that amateur stations are no longer licenced by RF power, but by field strength. This would mean restrictions on types of antennas, and many other factors which influence the field strength around the station.

At present most amateur stations in the world are licenced by RF power level, and can use any type of antenna. To be licensed by field strength would place heavy restrictions on the freedom of the amateur movement.

At least one West German television manufacturer can produce television receivers with an immunity in the order of 100V/m, and have demonstrated they can run a transmitter and a television receiver on the same feeder with no interference.

Field strength measurements can only be near predictable in ideal non- cluttered situations — introduce the effects of domestic wiring, pipe work building, etc, and the readings outlined would be anyone's guess. Is this a good basis for legally enforceable variations to the amateur licence?

Yours sincerely,

A D Tregale VK3QQ,
73 Nepean Street,
Watsonia, Vic. 3087
ar

LONG WIRE OF COINCIDENCE
Army Signals in 1930-34

I was pulled up short by the last paragraph of the article in AR, July 1987, pp28/29, describing the Type-133 transmitter.

The author asked if anyone recalled the "Ack" or "Cork" sets which were apparently used by the Army up to the beginning of WWII.

By coincidence, it was only a few days before publication of this article that I was one of a group visiting the Army Signals establishment at Simpson Barracks, in Watsonia.

The Museum, at Watsonia, does not have either an "Ack" or "Cork" set, but I was able to give it a good newspaper photograph of three signallers from 3rd Division Signals, W/T Section, operating an "Ack" set at Seymour, about 1930 during an annual camp in the days of compulsory military training. I also gave a small amateur photograph of a tent housing a "Cork" set with its large frame aerial.

I do not recall details of the "Cork" set except that it did use a generator driven by a *Douglas* motor cycle engine as mentioned by John and a frame aerial as noted above.

The "Ack" set was a three-man pack. Transmitter, receiver and six volt accumulator plus aerial kit.

Frequency range was probably in the region of the 200 metre band. Transmission was MCW with a choice of three or four audio tones so that several stations could operate on the same frequency.

In training, the objective was to run to a designated spot with the equipment, erect aerial, tune up and send a signal in about three minutes.

The CO of the unit at the time was Colonel (later Major General) J E S Stevens and I can still recall him impressing on us that in action, "You don't walk, you don't run, you go at the (expletives deleted) gallop!"

Our OC W/T section was Captain (later Colonel) Stewart Embling VK3DC, ex OA3DC. By some means he persuaded the higher-ups to let us try shortwave operation.

A MOPA transmitter was built by Army Ordnance which was then located at Broadmeadows, Vic. This operated from a six volt accumulator with HT provided by a genemotor located in the same wooden case as the transmitter! (No reports of pure DC note were ever received!). Power was probably about 25 watts.

Antenna, also provided by Ordnance, was end fed with twisted flex feeders!

The receiver was built by volunteers on Sunday afternoons in VK3DC's shack in Toorak. It consisted of a regenerative detector followed by one or two stages of audio.

I cannot recall the frequency range but we did work amateur stations in the 30/40 metre band.

The transmitter and receiver no longer exist but it is known that a set of photographs of it were given to the Signals Museum some time ago by Colonel Embling and it is hoped that these will be located shortly.

If any reader has photographs or manuals of the "Ack" or "Cork" sets, the Army Signals Museum would be more than grateful to receive them. The address is, Curator Army Signals Museum, Simpson Barracks, MacLeod, Vic. 3085.

Allan Doble VK3AMD,
206 Poath Road,
Hughesdale, Vic. 3166
ar

ANTENNA TUNER

I read with great interest the Equipment Review of the Emtron EAT-300A Antenna Tuner in *Amateur Radio* June 1987.

The interest is because I own the "Economy Version" viz the EAT-300, and plan to buy an EAT-300A later in the year. Both Rudi Breznik and John George assure me that the tuning coil, condensers and basic circuitry are the same in both tuners.

I agree that tuning with the EAT-300 is very critical but I have learned to live with this. Aerials range from a 27 MHz mobile magnetic base whip to 10 metres of wire (emergency antenna), 135 feet of wire (main antenna), and 200! feet of wire when working portable each week.

Here are some examples from April 13, 1987:

FREQ MHz	1.629	1.775	1.828	3.575	7.075	14.106
SWR	<1.05	1.3	1.25	<1.05	<1.05	<1.05

When tuning a new aerial for the first time, I use initially 10 watts, then 20, 50 and 100 watts. I have had no trouble with arcing-over for any of my random wire end-fed antennas.

Thank you very much indeed for the regular Equipment Reviews.

Cordially,

John Robinson,
203 Tryon Road,
Lindfield, NSW. 2070
ar

APPROXIMATIONS FOR π

Having noted the headline *Ubiquitous* 2π, AR, July 1987, and read recently somewhere about *Metric* π (!), I have been reminded of some approximations, involving π, which make calculations simple if an electronic calculator is not to hand.

(= represents "approximately equal to).

$$\pi = \frac{100}{32}$$

Note that this is only half of one percent different from the true value of π. It has the advantage that the top line is a power 10 and the bottom line a power of two, making for easy paper and pencil calculations with 10s partially cancelling milli or micro, kilo or mega, prefixes when working out reactances or resonant frequencies. Similarly:

$$2\pi = \frac{100}{16}$$

Reactance of (electrolytic) capacitors in AC power supplies:

Power Line Frequency = 50 Hz

Hum Frequency (Full-Wave Rect) = 100 Hz

Typical Capacitance = 16 uF

Substitute in $Xc = \frac{1}{2\pi fc}$

And get: $Xc = \frac{1}{2 \times 100/32 \times 100 \times 16 \times 10^{-6}}$

Cancel out the 10s and twos and get:

$$Xc = \frac{1}{2 \times 100/32 \times 100 \times 16 \times 10^{-6}}$$

$$= \frac{1}{10^4 \times 10^{-6}}$$

$$= \frac{1}{10^{-2}}$$

$$= 10^2$$

$$Xc = 100 \text{ (ohms)}$$

Thus reactance of a 16 uF capacitor at 100 Hz is 100 ohms — a useful and easy figure to remember.

So, of course, if 32 uF then Xc (at 100 Hz) = 50 ohms, or if 8 uF then Xc (at 100 Hz) = 200 ohms.

Yours faithfully,

Barrie Stevenson VK2ZSV,
21 Glendower Avenue,
Eastwood, NSW. 2122
ar

THANK YOU

I would like to take this opportunity to thank those responsible in the Institute for the manner in which this Company's modest advertising appropriation has been handled over the past 12 months when it has not always been possible to supply 'camera ready' copy.

I have been an advertiser in *Amateur Radio* magazine for 40 years and have always had a reasonable return on cost. My recent advertisement in the magazine for a Dip Meter has excelled any previous results. I believe this has been due primarily to the excellent Equipment Review conducted by Gil Sones which was published in the magazine.

It would seem that such reviews would more than convince prospective advertisers of the value of advertising in *Amateur Radio*.

Yours faithfully,

G Maxwell Hull,
Manager,
William Willis & Co Pty Ltd,
98 Canterbury Road,
Canterbury, Vic. 3126
ar

bankcard
MasterCard

A Call to all Holders of a

NOVICE LICENCE

Now you have joined the ranks of amateur radio, why not extend your activities?

THE WIRELESS INSTITUTE OF AUSTRALIA
(N.S.W. DIVISION)

conducts a Bridging Correspondence Course for the AOCP and LAOCP Examinations

Throughout the Course, your papers are checked and commented upon to lead you to a SUCCESSFUL CONCLUSION.

For further details write to:

THE COURSE SUPERVISOR
W.I.A.
PO BOX 1066
PARRAMATTA, NSW. 2150

(109 Wigram Street, Parramatta)

Phone: (02) 689 2417
11 am to 2 pm M to F and 7 to 9 pm Wed
AR86

QD ELECTRONICS

JOHN MELIA VK3QD

QUALIFIED COMMUNICATIONS TECHNICIAN (ENGINEERING)

PROVIDES EXPERT PERSONAL
SERVICE & REPAIRS
AND FAST AUSTRALIA-WIDE
MAIL ORDER SERVICE
AT VERY REASONABLE RATES

SECOND-HAND EQUIPMENT BOUGHT & SOLD

Manufacturer of

LOTEC RTTY, CW, MODEM
TRS80C SOFTWARE

TEL. (03) 751 1231

LOT 7 RIDGE ROAD
MOUNT DANDENONG VIC. 3767
Parcel Post to
C/- OLINDA RO. OLINDA VIC 3788

SUBSCRIPTION OFFER SPECIAL BONUS GIFT!

SUBSCRIBE NOW!

You'll receive 12 issues of Electronics Today International delivered post free to your home or office and a free UBD Directory for your area* for only $35.40.
Simply fill in the details opposite to take advantage of this special offer.

*NSW, VIC, QLD, WA, indicate Capital City or State directory; NT will receive Touring Guide and Local Map; TAS will receive State Directory; SA will receive an Adelaide Street Directory & State Touring Guide.

September ETI offers you

- ★ ***Three great projects to build, easy and cheap.***
- ★ ***The latest on the Very Fast Train scheme.***
- ★ ***Sound Insights, Australia's highest circulating hi-fi monthly absolutely FREE.***
- ★ ***Kilohertz Comment from Arthur Cushen***
- ★ ***Louis Challis on the Micro-Seiki Compact Disc player.***

If you want to enter the world of electronics you will want to subscribe to ETI, the all Australian authority.

YES! Please send me this special offer of 12 issues of Electronics Today International (one each month) along with my free UBD directory, NSW, VIC, QLD, WA. Please indicate:
Capital City ☐ or ☐ Country Directory

☐ I enclose my cheque/money order
(with this form in an envelope) for $ .....

(make cheques payable to: The Federal Publishing Co. P/L)

Charge by ☐ Bankcard ☐ Mastercard
☐ American Express ☐ Visa with $ .....
(10% Discount for orders of 6 or more)

Card No. Expiry Date /

Signature .....
(unsigned orders cannot be accepted)

Mail Post Free in Australia to:

Freepost No. 4
The Federal Publishing Company
P.O. Box 227 Waterloo, N.S.W. 2017

Name: .....
Mr/Mrs/Ms/Miss Initial Surname

Address: .....

..... Post Code: .....

Date of Order: / / Telephone: ( ) .....

Electronics Today International is Australia's most authorative electronics monthly. It contains a wealth of news and features about the electronics industry here and abroad as well as innovative accessible projects. Computers, astronomy and amateur radio, if it uses or produces electricity you can be sure its in ETI.

Federal Publishing Company
180 Bourke Road,
Alexandria. 2077
Ph. (02) 693-9999

Silent Keys

It is with deep regret we record the passing of —

MR G W CAMP	VK2NZ
MR PHILIP CORLISS	VK2ANG
MR G MAXWELL HULL	VK3ZS
MR H A LEE	VK6AE
MR V MATHEWS	VK6VN
MR R W PATTERSON	VK2AJW

Obituaries

PHILLIP EVERETT CORLIS VK2ANG
November 3, 1904 — June 27, 1987

"A man with an inexhaustible zest for life, learning and discovery." That was how a reporter from the *Newcastle Herald* described Phil Corlis in an article he wrote about him in 1963, and this is how Reverend Bruce Edgell prefaced his address at Phil's Memorial Service at the Uniting Church, Armidale on June 30, 1987.

Phil was born in Casino, his father being a well-known GP on the North Coast. His grandmother (Corlis) had also been a doctor, an immigrant from Canada, the first woman doctor to be registered in Australia. His childhood years were spent in Ballina, Bangalow and Grafton. Classical music was very much part of his life, and he was apprenticed as a piano tuner in the early 1920s. His work required him to travel through Central Queensland in a car loaded with portable gramaphones, harmonicas, records and sheet music; and to go from one station property to another, over roads that were often bad and treacherous. He also tried his hand at dairy-farming for a while near Nambour, before moving to the New South Wales North Coast again, pursuing his piano tuning career.

When World War II was declared, Phil joined the Army and served in Signals. He was also a Physical Training Instructor. Later in the war he was transferred to the Munitions Department, working in Newcastle.

Phil and his wife, Ivy, reared their family of four sons in Newcastle, where they lived until about 1970, when they moved to Armidale. Here Phil resumed his profession as a piano tuner. He had obtained his AOCP in 1947 and was an active amateur and member of the WIA, helping many newcomers with equipment and CW training. Phil was also skilled in sheetmetal working, cabinet-making, gem-stone cutting and rifle shooting, with added interests in astronomy and orchid growing. His two metre high grandfather clock and spinning wheel still grace the hallway in the Armidale home.

For most of the last four years of his life, Phil had not enjoyed good health, but, despite failing eyesight, he still continued as an active member of the Armidale and District Radio Club. A large attendance at the Memorial Service bore testimony to Phil's standing in his church and the general community. Radio club members now record their appreciation of Phil's life and work and their heartfelt sympathy to Ivy and family.

John Moen VK2KA and Hans Van Der Drift VK2KHV
ar

FRANK O'DONNELL VK2QC

Frank passed away on Monday, July 6, 1987.

He had been on air for approximately 40 years and moved to Dalmeny from Victoria about 10 years ago.

Condolences are extended to his wife Meg, and family.

Stan Bourke VK2EL
ar

HENRY SPORRER VK2DUO

It is with deep regret we report the passing of Henry Sporrer VK2DUO, on Monday, July 6, 1987 at the age of 70 years.

Henry suffered a massive heart attack. He was well-known on the HF bands, a stalwart of the Intruder Watch and was one of nature's gentlemen.

Deepest condolences are extended to Margaret and family.

Ian O'Toole VK2ZIO on behalf of the Castle Hill RSL Radio Club

MAX POTTS VK2EK

It is with deep regret we report the death of Max Potts VK2EK. Max passed away in the early hours of June 2, 1987, aged 72 years.

Max's first call sign was VK2ZMP. Later he upgraded and obtained the call VK2BMH. Upon the death of his friend, Ted Kenny, and at the request of Ted's widow, Max received VK2EK.

Max was an early member of the Waverley Radio Club, in which he was an active member. He later moved to Wentworthville, where he resided until his death.

In his youth Max was associated with the early days of aviation. He was a friend and mechanic of Sir Charles Kingsford Smith.

Max joined an engineering organisation where he rose to an executive position. The stress of this position caused Max to retire earlier than normal with ill-health. The side-effect of his treatment caused deterioration of his health, a condition he lived with for the rest of his life.

He was an inspiration to all his friends. Although often in pain, he rarely complained. Keeping his scheds with his mates on two-metres was often difficult, but his cheery voice gave no indication of his condition.

Max is survived by his wife and pal. Edna, sons Denis, Max, Tony, Kerry, Paul, daughters Denise and Janice and brother Reg.

On behalf of Max's friends deepest sympathy is extended to his family.

Ken Ledsam VK2ST
ar

STEVE ST GEORGE VK4SE

The inimitable Steve has gone and amateur radio is very much poorer with the passing of VK4 Sugar Easy, (as he wished to be known), on July 10, 1987. This entertaining raconteur had finally lost his last battle against illness which had plagued him for the last few years.

Steve was born in 1916, and his RAN service began upon enlistment in 1935. He saw service on various vessels including the Australian Naval Cruiser, *HMAS Canberra*, and the British Naval Cruiser *Shropshire*. His ship patrolled the Atlantic waters off Spain during the Spanish Civil War in 1936, and he saw duty in the Red Sea and Indian Ocean during the Abyssinian War in 1937.

During WWII, Steve was aboard *HMAS Canberra*, which was torpedoed and sunk in Guadacanal. The ship's ensign, which draped his casket at his funeral, was heroically rescued by him just before the sinking and has been bequeathed to the War Memorial in Canberra. Very few of Steve's friends knew of his dedication to the naval tradition and the part he played.

As a civilian he retained his interest in radio and television, working for the ABC in Toowoomba and Sydney, a local commercial and interstate stations. Following his retirement he became very interested in amateur radio and was a foundation member of the Darling Downs Radio Club and a past president.

There are many amateurs today who can thank Steve for the classes he conducted (up to 30 students at a time), which enabled them to obtain their licenses. His home and shack were always open to anyone with a problem or a desire to acquire more knowledge. He was a member of the SES and his prime achievement in this field was organising the rescue of a locally manned yacht (one of his pupils) which was dismasted and out of fuel some 200 miles off the shipping lanes near South Africa. Steve alerted Air Sea Rescue in Canberra, maintained contact with the vessel for several days, assisted by a local amateur, two Western Australian amateurs, and a South African operator. Due to a failing battery supply their tenuous link with Steve in Toowoomba was maintained using CW which enabled searchers to pinpoint their location and direct a diverted a freighter to rescue the *White Wave* and her crew of three and deliver them safely to their home port of Brisbane.

Steve's wife predeceased him 18 years ago. Deepest sympathy is extended to his daughter Anne and son John.

The large representation of district amateurs and ex-service personnel at the funeral service was an indication of their high regard for our late colleague. Farewell Steve, a true amateur.

Eric Wissemann VK4ADA on behalf of the Darling Downs Radio Club
ar

DEE DAVIS KA6BXV/7

Australian and New Zealand 10 metre enthusiasts were saddened to learn of the passing of a friend, Dwain Davis KA6BXV/7, on July 1, 1987.

Dwain, better known as Dee, had an affection for Australia and New Zealand and derived great pleasure from studying the countries and speaking with his friends, many of whom he had met during a visit six years ago.

Dee's love for Australia was so strong that his family requested *Waltzing Matilda* be played at his church memorial service as a final tribute to the country and people he loved so much.

To his wife, Earline, and family, Tom, Margerite, James and Paul, we extend our deepest sympathy.

Ian Buchanan VK2KL on behalf of VK4FE, VK6MD, VK2KL, VK2EER
ar

M F POTTS VK2EK

To our host of friends in amateur radio . . .

Of great comfort during our sorrow were the expressions of sympathy conveyed to us in many ways.

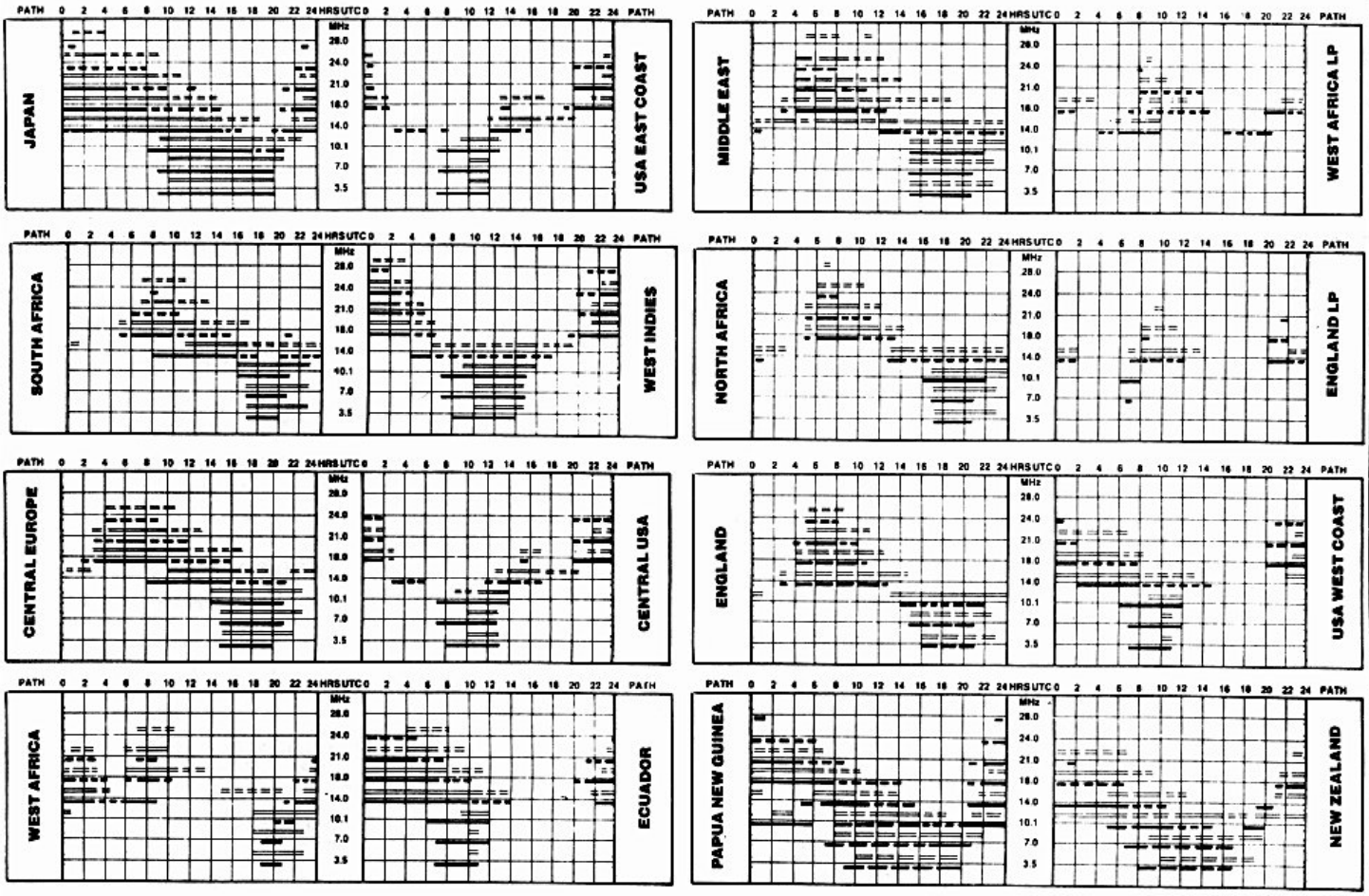
We deeply appreciate your thoughtfulness and thank you most sincerely.

Mrs Edna Potts and Family
ar

This space is reserved for your business card.

Ionospheric Predictions

Len Poynter VK3BYE
14 Esther Court, Fawkner, Vic. 3060



All paths unless otherwise indicated; (ie LP = Long Path) are Short Path.

Predictions are presented courtesy of the Department of Science, IPS Radio and Space Services, Sydney.

Solar Geophysical Summary

MAY 1987

Solar activity was low in May except for two M1 flares on 24 and 25th. Throughout the month there were a number of regions visible on the solar disc and the largest of these was responsible for the two solar flares. This region was responsible for the rise in the 10 cm flux values in the second half of the month.

The 10 cm flux ranged between a low of 75 on the 31st from a high of 98 on 19-22nd. The monthly averaged sunspot number was again high (30.6). The high values for the last two months have pushed up the yearly averaged sunspot numbers for October and November 1986. This means that September 1986 is almost certainly the month of the solar minimum and the start of Solar Cycle number 22.

Geomagnetic activity for the month was mainly quiet with only two disturbances. On May 25, the A was 22 and on the 29th it was 21.

From data supplied by the *Department of Science IPS Radio and Space Services*, May 1987

ar

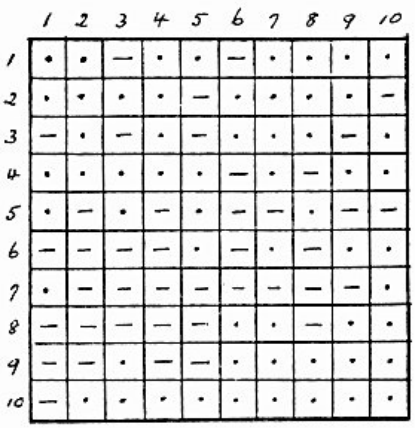
COMPUTER PROGRAMS

Due to the length and quality of some computer program printouts, it is frequently impossible to reproduce them effectively for others to copy. Members interested in particular programs are advised to contact the author for an original copy of the relevant program. (Please include an SASE).

Solution to Morseword 6

Across: 1 flee 2 sleet 3 tenner 4 sure 5 arty 6 once 7 jog 8 ogre 9 manse 10 this

Down: 1 fro 2 home 3 cage 4 hog 5 pug 6 dots 7 Sale 8 stage 9 inks 10 etuis



DEADLINE

All copy for inclusion in the **October 1987** issue of *Amateur Radio*, including regular columns and Hamads, must arrive at **PO Box 300, Caulfield South, Vic. 3162**, at the latest, by **9 am, September 21, 1987.**

Hamads

PLEASE NOTE: If you are advertising items FOR SALE and WANTED please write **each** on a separate sheet of paper, and include all details; eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. ***Please do not use scraps of paper.***

- Please remember your STD code with telephone numbers
- Eight lines free to all WIA members. $9.00 per 10 words minimum for non-members
- Copy in typescript, or block letters — double-spaced to ***Box 300, Caulfield South, Vic. 3162***
- Repeats may be charged at full rates
- QTHR means address is correct as set out in the WIA current Call Book

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.

Conditions for commercial advertising are as follows:
$22.50 for four lines, plus $2.00 per line (or part thereof)
Minimum charge — $22.50 pre-payable
Copy is required by the Deadline as indicated on page 1 of each issue.

TRADE ADS

AMIDON FERROMAGNETIC CORES: Large range for all receiver and Transmitting Applications. For data and price list send 105 x 220 mm SASE to: **RJ & US IMPORTS,** Box 157, Mortdale, NSW. 2223. (No inquiries at office . . . 11 Macken Street, Oakley). Agencies at: Geoff Wood Electronics, Lane Cove, NSW. Webb Electronics, Albury, NSW. Truscott Electronics, Croydon, Vic. Willis Trading Co, Perth, WA. Electronic Components, Fishwick, Plaza. ACT.

WANTED TO SWAP— NSW

FT-690R ALL MODE 6m TX: plus 10W amplifier & 6m beam for HF Tx — 100W PEP & digital. In GC only please. Also FT-480R, all mode 2m unit for base station scanner. Licensed amateurs only. S Reeves VK2CT, QTHR.

WANTED — NSW

2m FM RIG: SSB if possible. No hand-helds please, for approx $250. John VK2CJV, QTHR. Ph: (02) 809 5024 AH.

DRAKE R-7A, JRC NRD-515 RECEIVERS: & KX-3, SX-3 Mizuho antenna tuners. Also old *Amateur Radio* magazines. Would also like to hear from R-7A & NRD-515 radio users. Tony. Ph: (042) 29 2573.

HF TRANSCEIVER: Yaesu, Kenwood, or Icom. Good condition. Prices $200-$400. Vlado VK2AEA/OK3CUU. Ph: (02) 891 2276.

YAESU FT-200 HF SSB TRANSCEIVER: In working order. Ian VK2DNI. Ph: (02) 871 4471.

YAESU FT-780R 70 cm ALL MODE TRANSCEIVER: Larry VK2EOY. Ph: (02) 949 3124.

WANTED — VIC

CIRCUIT DIAGRAM: Televideo terminal & keyboard, model 950. Original or photocopy. Jules Perrin. Ph: (03) 369 6573.

LOG PROGRAM: Software or program for use with Apple IIe to log QSOs in contests. Will pay any costs involved. Mast sections. Threaded mast sections 2.75 ins (70mm) to fit ex-Army tripod mast combination. Ken VK3AJU, QTHR. Ph: (03) 527 9029.

PHILIPS REMOTE CONTROL HEAD: Suitable types are CU941, CU938. Prefer unit in working order. These units were supplied to work with the FM828 & FM747 series of Philips radios. Details & price to Ron VK3XOA, QTHR. Ph: (053) 35 6017.

WANTED — QLD

IC-402 PORTABLE 432 MHz TRANSCEIVER: Must be in good condition. Price to VK4KAL, QTHR. Ph: (079) 85 4168 (AH).

MORSE KEY PADDLE TYPE: Prefer simplex bug, however interested in suitable electronic type. Tom Sawers VK4AOG, QTHR.

YAESU FL-2100Z LINEAR AMPLIFIER: in good condition. No mods, prepared to pay sensible price. Price & details to VK4ATQ, QTHR. Ph: (07) 374 1008.

FOR SALE — NSW

ANTENNAS: KW Electronics multi-band dipole all-weather traps. $60. 12 element 2m Yagi. $45. 17 element 70 cm Yagi. $45. Larry VK2EOY. Ph: (02) 949 3124.

ARLEC 13.8V 2A POWER SUPPLY: $90. Pearce Simpson SSB AM CB with PLL. $120 ONO. Conrac B/W eng monitor CRT still good. Solid State. $180. VK2CJV, QTHR. Ph: (02) 809 5024.

COAXIAL WAVEMETER: (fixed) 23 cm band BNC in/out. Similar to that in RSGB VHF-UHF Manual 3rd edition, page 10.28. $30. VK2ZD. Ph: (02) 427 3281.

KENWOOD 2m FM MOBILE TRANSCEIVER: TR 7730. Excellent condition. $350. Also Yaesu 2m FM hand-held FT208 with charger. $200 ONO. Andrew. Ph: (02) 635 4883 AH.

KENWOOD SM220 STATION MONITOR: Complete with manual & lead. In excellent condition. $425. Ray VK2AWQ, QTHR. Ph: (064) 94 1347.

KENWOOD TS-430S HF TCVR: with PS430 power supply, CW narrow & AM filters, FM board fitted, MC42S scan microphone, OC lead, manual, flawless condx. $1500. Kenwood TS930S (on board power supply) fitted CW narrow filter, manual, excellent condx. $1950. Owner returning to UK. George VK2EZA/G6VS. Ph: (047) 30 1666.

KENWOOD TS-520S TRANSCEIVER: Like new, has had little use together with manual & carton. $495. John VK2VJD, QTHR. Ph: (047) 51 4257 evenings & weekends.

SWAN 500 & P/S: Hallicrafters SX-110 general coverage receiver; Granger 174 four channel transceiver; BC 221 frequency meter with P/S & calibration book. All with manuals. VK2AKR, QTHR. Ph: (02) 81 4659.

TELETYPE MODEL 33KSR: New type-cylinder, 300 baud, 7 data bits, even parity, 1 stop bit. Ideal as printer for any PC (letter quality) or for RTTY with Baudaut to ASCII conversion. $120. VK2DWO. Ph: (02) 858 1085.

YAESU FT107/DMS TRANSCEIVER: WARC bands. As new condition, with factory service manuals. $750 ONO. Also Swan 100MX transceiver factory service manual. $10. VK2BTL, QTHR. Ph: (02) 487 3383, 359 3434.

YAESU FTDX401: Excellent condition, plus collectors items! Geloso VFO, new in carton, Collins mechanical filter 2.1 kHz. Offers? VK2DDR. Ph: (02) 949 3426.

FOR SALE — VIC

ALLIANCE ANTENNA ROTATOR & CONTROL BOX: in working order. Requires some maintenance. $70. VK3EJV. Ph: (03) 438 2878 after 6 pm.

TEN TEC ARGONAUT: with complete documentation plus 240 VAC power supply. Tx side partially faulty. $100. Ph: (03) 699 9584.

YAESU FT-101Z TRANSCEIVER: In good condition. Late model, hand book. $500. Casey VK3ABC, QTHR. Ph: (051) 74 7553.

FOR SALE — QLD

ALPHA 76PA"E": 3x8874 Eimac triodes, current model, absolutely mint & unmarked, whisper quiet full ducted blower cooled, 1 kW cont. Duty 1/P, P1-L o/p, 1.8-2 & 3-30 MHz. Possibly the best amp available today. Ph: (07) 378 1876.

FT-7 HF TRANSCEIVER: Covers 80-10 metres. As new still in box. Would suit novice. $385. Pat VK4VGS. Ph: (071) 85 1240 After 6 pm.

JUNK BOX CLEAN OUT: Transmit variable capacitors ex-TU9A units: 2 x 77 pF; 1 x 116 pF, 2 x 20 pF, 1 x "BUD" 100 x 100 pF 2 mm spacing; 2 x 140 pF & 1 x 100 pF ex Command tx. Various 2 & 3 gang "F" B/C types (AWA make). VK4KAL, QTHR. Ph: (079) 85 4168 AH.

KENWOOD R-1000 RECEIVER: with service manual. $350. Icom IC-551, 6m transceiver with FM, VOX, & PBT boards fitted. $400. VK4KEE. Ph: (071) 28 2785.

RACAL RA217D SOLID STATE COMMUNICATIONS RECEIVER: (RA329 system). SSB/AM/FM/FSK 1 to 30 MHz, plus down to 200 kHz. VGC in transit case complete with manuals (comprehensive). $450. Also Racal RA17C valve communications receiver still in current use by departments. VGC. Complete with manual. $450. Marconi TF995A/5 VHF FM/AM signal generator complete with manual. $800. AWA TV sweep generator, 5" CRO, calibrator & FSM. The lot $350. Please Contact Bob VK4OY. Ph: (07) 396 0886.

TOWERS: Hills 4-section winch-up to 100 ft. Heavy galvanised, complete with rigging. $775. Also Hills 3-section winch-up to 55 ft. $475. All in good condition. VK4YF, QTHR. Ph: (071) 82 1183 or (075) 48 3184.

TS-130S, IC-740: or similar compact mobile rig in top condition required. Details to John VK4SZ, QTHR. Ph: (070) 61 3286.

FOR SALE — SA

HUSTLER MOBILE ANTENNAS: incl 6, 10, 15 & 80m resonators. Complete with HD spring base. $150. VK5FH, QTHR. Ph: (085) 56 2253 AH.

VZ300 COMP & RTTY MODEM: Data cassette, demo tape WKSP manual, comp manual, all leads. As new. $180 plus freight. Morse-A-Keyer, keyboard type. 5-45 WPM adjustable, inbuilt side tone osc, 5V PW PK, instructions. As new. $100 plus freight. VK5PH. Ph: (088) 53 2091.

FOR SALE — TAS

YAESU FT-980 GEN COV TCVR: as new, boxes, service manual etc. $1900 ONO. Yaesu FT209RH access 2 metre h/held. Soft case, PA3 mobile charger, adaptor, ext speaker/mic. What offers? Kenwood TM411A, late model UHF FM, 25W t/ceiver, mobile. As new, boxes, etc. $485 ONO. VK7AN, QTHR. Ph: (003) 31 7914.

STOLEN EQUIPMENT

An Icom IC022A VHF FM transceiver has been stolen from Roger Henley VK2ZIG. Serial number is 3402112 and the original microphone has been replaced with a Willis-brand microphone.

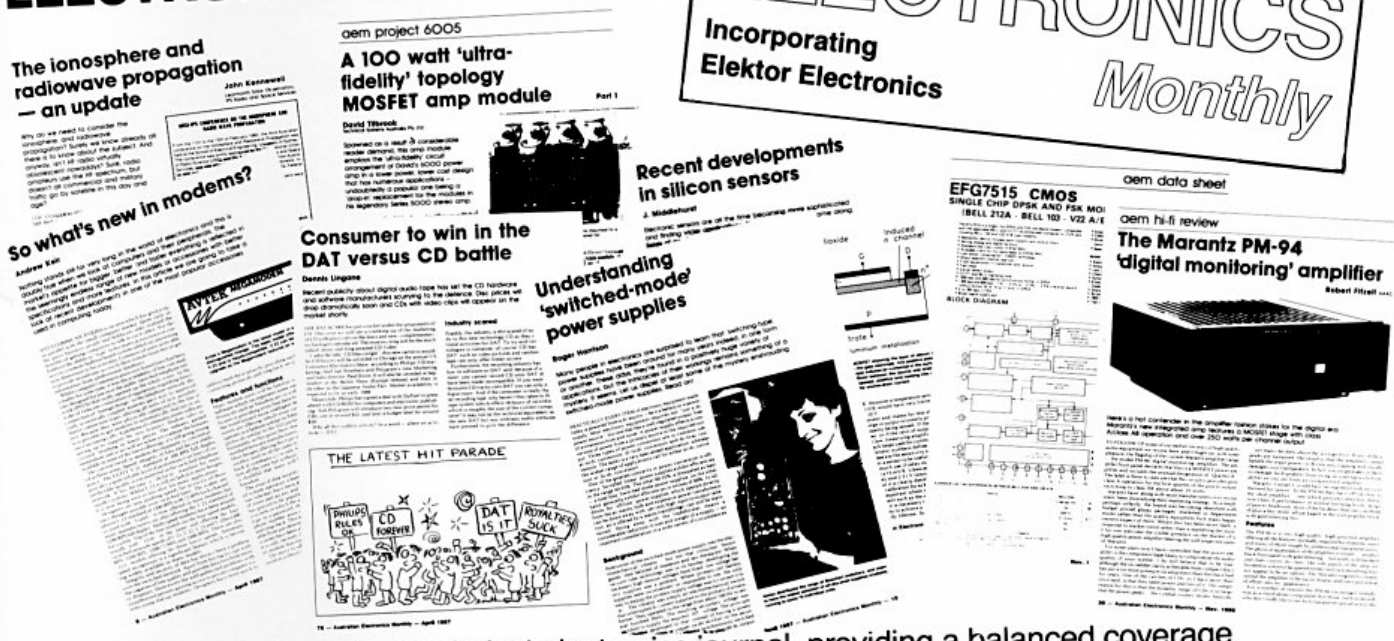
If any members are offered this transceiver or have any knowledge of it, they are requested to contact Ermington Police Station, your local police or Roger VK2ZIG.

Advertiser's Index

SUBSCRIBE!

TO AUSTRALIA'S TOP ELECTRONICS JOURNAL

Roger Harrison's
Australian ELECTRONICS Monthly
Incorporating Elektor Electronics



Australia's only independent technical electronics journal, providing a balanced coverage of the fields of audio, broadcasting, pro sound, video, communications, computing, engineering and technology.

Published by Kedhorn Holdings P/L, inc. in NSW, Fox Valley Centre, Cnr Fox Valley Rd & Kiogle St, Wahroonga 2076 NSW

For only $49.95 for 12 issues, you get:

- **5 to 10 projects to build each month**
  – the best from our Australian designers and the cream from the British Elektor.
- **Monthly Project Buyers Guide**
  – each issue we detail where you can get the components featured in our projects as well as which firms are stocking kits of our projects.
- **Telephone technical enquiries**
  – yes, you can speak to the editorial team direct and have your queries answered. We don't live in an ivory tower!
- **Hi-Fi, sound and video news, reviews & features**
  – independent, professionally conducted reviews from Robert Fitzell Acoustics; features from well-known writers like Dennis Lingane and Malcolm Goldfinch.
- **Practical computing articles**
  – a whole section each month devoted to electronics enthusiasts exploring computing and computing enthusiasts exploring electronics.
- **Communications coverage**
  – news, reviews and practical features on RF techniques and radio communications, covering everything from circuit techniques to cellular radio, from satellites to amateur radio.
- **Topical technical features**
  – covering consumer electronics, topical technological and scientific fields, current issues and circuit techniques.
- **What's new in the market**
  – occasional features on new products and developments, giving topical and informative coverage of specific fields and product groups.

You'll find something to interest you every month in Australian Electronics Monthly, no matter what your special interest might be. The magazine is "sectioned" into categories for easy reading and easy reference, each section headed by its own news column.

If you've found AEM hard to get in your newsagent, DON'T DELAY, SUBSCRIBE TODAY!

If you work in electronics, communications, computing or servicing, a subscription to Australian Electronics Monthly could be tax deductible.

COUPON

Yes! Put me down for a subscription to Australian Electronics Monthly at $49.95 for 12 issues. I am paying by (please circle payment method):

Cheque: (No:) _____

Money Order (No:) _____

(Cheques or Money Orders should be made out to "Australian Electronics Monthly")

☐ Bankcard ☐ Visa ☐ Mastercard ☐ Amex

Card No:_____ Expiry:_____

Signature:_____

(Note: unsigned credit card orders cannot be accepted)

Name:_____

Address:_____

_____ Postcode_____

The first multi-band transceiver that'll impress everyone except car thieves.

The new ICOM IC-900A is a totally new modular concept in multi-band amateur radio transceivers.

First, it's designed to fit into the stylish, compact instrument panels of modern cars rather than the glove box. Secondly the modular concept makes theft less attractive.

You see, what makes this concept so impressive is that the main and most expensive components of the radio can be secured and hidden away in the boot.

Its technology is equally impressive.

The IC-900A is the first known to use optical fibre technology in an amateur transceiver. It uses optical fibre cable as a link from the two interface units. One for the remote controller and the other for the band units.

This provides an accurate display of frequency and memory data for any data for any two bands in use.

The IC-900A has a multi-band independent receive and transmit capability. So, it can monitor and use each installed band simultaneously, giving the effect of multiple transceivers.

The transceiver has 10 programmable memory channels in each band unit; up to 60 memories all together. Tuning can be selected in 5 KHz, 10 KHz, 15 KHz, 20 KHz and 25 KHz steps. Options include either the UT-28 Digital Code Squelch (DCS) unit or UT-29 Tone Squelch Unit.

The UX-19 band unit covers 28-30 MHz with 10/1 watt selectable output. The UX-59A covers 50-54 MHz at 10/1 watts. The UX-29A covers 144-148 MHz at 25/5 watts (a UX-29H version offers 45/5 watts). The UX-49A covers 430-440 MHz at 25/5 watts. And the UX-129A covers 1240- 1300 MHz.

If you find all this impressive, you'll be most pleased to read that the IC-900A handbook is excellent and simple to follow. Especially on installation procedure.

Perhaps the best thing to do is to visit your ICOM dealer and see how more impressive the IC-900A is in the flesh.

For details of your local dealer phone ICOM on Melbourne (03) 529 7582 or (008) 33 8915 from elsewhere in Australia.

ICOM

HENDERSON MERRICK DI STEFANO IC 456